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Another Cyclopædia of Architecture.

THE attempt to compress and codify the endless subject of architectural history, æsthetics, and construction within the limits of a single publication seems to have a kind of fascination about it, and tempts one author and editor after another. The complete treatment of the subject in encyclopædic form is in fact hopeless: something must be given up, or the work is beyond the limits of human life and energy. The most remarkable efforts in this direction during the present century have been the work of English compilers; Gwilt, Fergusson, and the editors of the "Dictionary of Architecture." Gwilt aimed mainly at an encyclopædia of architecture as the practical science of building, in which respect he produced a unique and monumental work; but to accomplish this he had to cut his historical section very short, and deal only in generalities and in very imperfect illustrations. Fergusson aimed only at history, and produced in that sense a monumental work. The editors of the "Dictionary of Architecture" did not limit themselves as to scope of subject—they embraced in their scheme history and construction alike; but they limited themselves as to detail and illustration, and professed only to treat each subject in outline, adding however the very important element of a list of the works from which more detailed information in regard to each item could be obtained. On the whole the "Dictionary of Architecture" is the work which of all others best justifies its name. As far as its limits of space allow it is the most thoroughly all-round work of the kind that has been published. M. Planat, the French editor, professed to produce an encyclopædia of architecture with the addition of profuse and excellent illustrations, but it turned out that practically it was an encyclopædia of French architecture, or of architecture from a French point of view, with a few other elements thrown in. The late M. Daly had drawn up the scheme for an encyclopædia of architecture which in completeness and extent of range was to have surpassed all others; but the scheme was so enormous that it may be questioned whether he could have completed it even had he been a young man instead of an old one at the time of its projection: as it was, the scheme appears to have perished with him.

Mr. Longfellow, in adding one more architectural encyclopædia to the list, has limited himself as to place and time, confining his book* to the illustration and description of ancient architectural monuments in Italy, Greece, and the Levant. This limitation of locality enables him to include the principal field of ancient classic architecture (or to profess to include it), and a great deal of what is most interesting in Renaissance architecture; nevertheless one cannot but feel that a work which excludes Asia Minor, all except the coast line, Roman remains in Africa, the whole of French and Spanish Renaissance, and the whole world of Mediæval architecture, is a somewhat partial and restricted form of architectural encyclopædia. The work is in fact an illustrated guide-book to the leading architectural remains of the part of the world included under its scheme, comprised in a bulky quarto of nearly 550 double-column pages, and printed and got up in an exceedingly sumptuous manner. That the selection of examples even within these limits was difficult the editor admits in his preface, and excuses himself for omitting much historical information in regard to many of the buildings treated of in order to keep the book within compass. As he says, "architectural interest first and historical interest second were the obvious tests"; and while some large and conspicuous buildings were omitted as being of secondary interest in these respects, many that are less conspicuous were included in consequence of some special interest inherent in them as illustrating the evolution of a style, or for other special reasons.

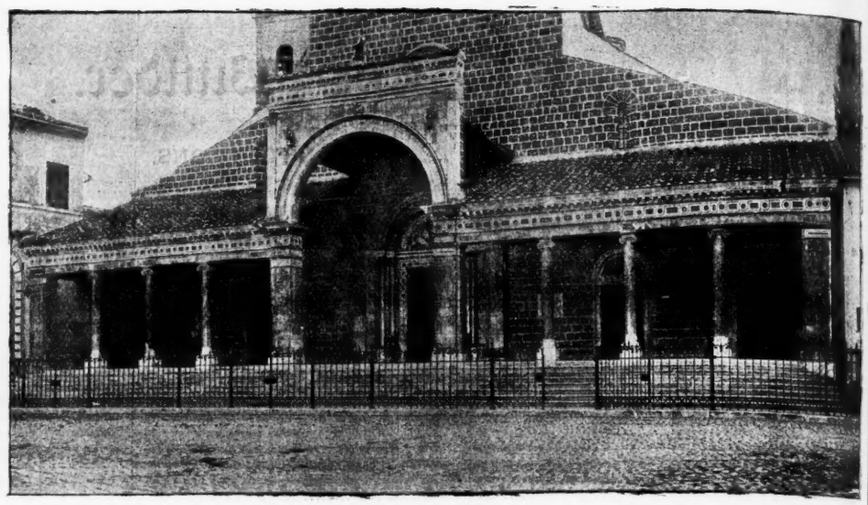
One of the best points about the book is the system on which the illustrations have been carried out. The majority of them have been reproduced from photographs. The immense advantage of this, in regard to ancient architecture, and in a work where only pictorial illustration and not architectural analysis is aimed at, is that photographs can be depended on to give the actual facts of appearance and texture literally, and the illustrations are not subject to the variations due to the personality of the artist, his special touch, and his way of seeing things. In one or two cases special drawings have been made for special reasons. Thus the interior of St. Sophia is shown by a drawing by the editor, the nature of the interior being such that it is almost impossible to get a photographic illustration of it which does not distort the curves and misrepresent the proportions of the design. Another interesting drawing is one of the rear view of St. Peter's, constructed from photographs and measured plans, so as to show the church from this point of view as Michelangelo meant it to be seen, but as it cannot now be seen on account of the houses crowded about it. We thus get the composition of the lower portion of the design in correct relation with the dome, which on the entrance front is destroyed by Maderno's lengthening of the nave beyond the lines of the original design. The critical consideration of the design of St. Peter's, its merits and its defects, is admirably done, and the perusal would form an excellent preparation for the first study of the church by a non-architectural visitor. To architects the considerations embodied in the criticism are familiar, but this is a book likely to be attractive to the general reader rather than to architects, and it is satisfactory to find such sound criticism provided for that class of readers.

Generally speaking the descriptions of the buildings treated of are excellent within the limits allowed by considerations of space. Occasionally we note omissions in regard to important facts which should have been briefly noted. Thus, under "Megalopolis" there is no mention made of the nature of the discoveries in regard to the proscenium accessories, and of the controversy to which they have given rise, a point which any visitor to the site should at all events have heard of. The building behind the theatre should have been mentioned by the name by which it is generally known—the Thersilion. In speaking of the Heraion at Olympia it is observed that the curious differences in the design of the columns "are explained by the fact that the columns were erected at widely different intervals to replace the original shafts of wood," leaving the reader to understand that this was a proved fact or a universally-accepted explanation. The writer should

* A Cyclopædia of Works of Architecture in Italy, Greece, and the Levant. Edited by W. P. P. Longfellow, Honorary Member and late Fellow of the American Institute of Architects. New York; Charles Scribner's Sons: London; T. Fisher Unwin: 1895.

have said "have been explained," leaving it clear to the reader that this was only one view of the matter, which may or may not be accepted. For an American critic, however, we presume that the fact that the German archæologists have accepted this explanation, worked out by one of themselves, is sufficient. For we find evidences in various portions of the book of the usual American tendency to swear by German archæologists and to pass over English views and discoveries as of little or no importance. Thus, in the account of the Parthenon, while the main facts about its curved lines are briefly and correctly mentioned, the fact that Mr. Penrose discovered and accurately measured these is quietly ignored, his name not appearing at all in the description, except at the end in a reference to his theory as to the original temple of Athene having been on the site of the Parthenon, which is only referred to for the occasion of remarking that Dr. Dörpfeld's view is more generally accepted. It appears probable that the editor is not even acquainted with Mr. Penrose's great work on the "Principles of Athenian Architecture," which, as all our readers know, is really an elaborate scientific study of the Parthenon (and as such one of the most remarkable architectural monographs in existence), for it is not even mentioned in the list given at the beginning under the head of "Bibliography"; a piece of ignorance which seems really astonishing. In the article on the Temple of Jupiter Olympios it is mentioned that Dr. Dörpfeld stated in 1886 that the temple was octastyle, which was a mere opinion without proof; the fact that it was Mr. Penrose who excavated the site, proved the octastyle character of the temple, and restored its main proportions and plan from his own investigations, being completely ignored, Mr. Penrose's name here again being not even mentioned. Is this sheer ignorance, or is it a determination to ignore everything done by English archæologists, and give all the credit to the Germans? Either way it is not very creditable to the editor. Again, in the article on the Parthenon, the only reference to Lord Elgin is a sneering remark that he further damaged the temple, and shattered and threw down blocks of the cornice in order to carry off the metopes; a statement the truth of which, as put here, we very much question. That Lord Elgin practically preserved the greatest pieces of sculpture in the world from bit-by-bit destruction at the hands of the Turks; that their acquirement by and careful housing in the British Museum has really been the means not only of preserving them but of making them known to and accessible by the whole civilised world—of which there cannot be the slightest doubt, it is not considered worth while to mention. That the American public at large have an intense and unreasoning dislike to the English nation we have been recently told by various correspondents in the *Times*, though happily with contradictions by others who we hope are more near the correct facts; but certainly it seems that American writers on art and archæology have a most settled habit of refusing to English artists and archæologists their just credit; and this encyclopædia is one more illustration of it.

We are not desirous, however, to follow so bad an example; on the contrary we may recommend this sumptuous volume on one field of ancient architecture to the attention of those English readers who can afford to add a costly work of the kind to their libraries, and can assure them that they will find in it a great amount of information conveyed in an admirable literary style, written mostly in a spirit of enlightened criticism, and accompanied by a number of interesting illustrations. Of one of these, the porch of the not very well known cathedral of Civita Castellana, we give an example from a block lent by the publishers.* The building is one dating from the beginning of the thirteenth century, the porch bearing the inscription "MAGISTER : JACOBUS : CIVIS : ROMANUS : CUM : COSMA : FILIO : SUO : FIERI : FECIT : HOC : OPUS : A : DM : MCCX." The effect of the small widely-spaced colonnade on each side of the entrance is very graceful; the disconnected manner in which the archway and wall over it rise above the roof is not so good, and this portion of the front has been rather clumsily treated; but still it is a highly characteristic and interesting bit of Romanesque architecture.



Porch of Cathedral, Civita Castellana.

* In regard to the engraving it is fair to say that it is impossible to give one of these delicately-grained tone-blocks, with the necessarily rapid printing of a weekly paper, with the same effect which it can have from the slower printing, on glazed paper, in the original volume.

NOTES.

THE great hall of the Church House, which was formally opened this week, is a fine apartment, with a sufficient touch of ecclesiastical style about it to be in keeping with its object, while not in any way simulating a church interior. It is roofed with a richly treated timber roof of late Gothic type, springing from a hammer-beam bracket, with vertical supports carried down to the floor from the extremity of the bracket of each principal; these form a kind of narrow side aisles and serve also to connect the side galleries with the main design, the fronts of the galleries being carried along between the uprights. It is rather to be regretted that the consistency of the design should be somewhat marred by the fact that these supports are iron columns masked with an oak casing; as wooden supports they of course appear too thin in proportion for their position and function, and yet they hardly have the appearance of being casings; in fact, every effort seems to have been made to give them the appearance of solid timber. We should have preferred a frank admission of the iron supports, and an effort to harmonise them with the roof and the other work. The woodwork, which is all of oak, is very elaborate and contains a great deal of carved detail, all in a style harmonising with the type of late Gothic which is the prevailing note of the building, and which is treated, both externally and internally, in the manner which characterises Sir A. Blomfield's Gothic work generally, and which is familiar to our architectural readers. The space above the galleries is roofed by a series of arched panellings at right angles to the main span of the roof, and concentric with the heads of the large mullioned windows in each bay. As might be expected from its material and construction, the hall is very satisfactory in acoustic conditions. The principal staircase, with flights rising right and left from an entrance-hall paved with squares of black and white marble, is very agreeably treated, and the electric light standards on the balustrade show original and effective design. Externally the building, in brick with stone-dressings and tracery, preserves the same character of being a building suggesting connexion with the church, but not itself a church. The next step should be to get stained-glass into the windows of the great hall. They are probably designed with this object, for as it is, with the white glass, the hall is over-lighted, and it has been found necessary to hang light curtains over the windows on the south side. Moreover, the interior of the hall sadly wants colour at present. The stained-glass is we presume only a question of time and money; we hope it will be done soon; but from the nature of the architectural design, in which the windows all range and can all be seen together, it will be even more necessary than usual that the stained glass should be treated as a whole, and that no single window should be allowed to be inserted which is not a part of, and in harmony with, a comprehensive scheme for the entire series.*

THE rebuilding on the site of Her Majesty's Opera-house has apparently entered on an entirely new phase. The large opera-house for which Mr. Emden had prepared plans has fallen through, the company with which he was associated not being able to carry out their scheme, and it is now understood that an entirely different building is to be carried out for another company, by Mr. C. J. Phipps. This will include a large hotel and a small theatre. Possibly the alteration will be for the better; we hardly see that there was room for another opera-house in London as long as Covent Garden and Drury Lane were in full occupation; and the plans as proposed did not promise to produce anything like a model grand theatre in accordance with the latest views as to arrangement of site, at all events. It is to be regretted, however, considering the architectural importance of the site, that the question of how it is to be made use of seems to be settled so entirely on mere commercial grounds.

THE result of the limited competition for the Royal Insurance Company's new offices at Liverpool, reported under the head of "Competitions," is rather a surprise. Three very eminent London architects and four Liverpool architects were invited to compete, and Mr. Norman Shaw was the assessor. The first and third premiums are given to Liverpool architects not much known to fame; Mr. Mountford receives the second premium, and Mr. Belcher and Mr.

* We gave a pretty full description of the building and of its construction on the occasion of the visit of the Architectural Association. (See *Builder*, February 9, 1895.)

Collcutt, the other two London architects in the competition, are not placed. If this was the assessor's award, it is no doubt highly creditable to the two Liverpool architects, Mr. Doyle and Messrs. Woodfall & Eccles; but it would certainly be of interest to know whether the assessor's award has been followed, as we observe that the Liverpool papers, in giving the result, say nothing about the assessor, but state that "the directors have awarded the first position," &c.; a phrase which, under the circumstances, seems to require explanation.*

THE final conclusions ot the London County Council Committee on the water question are, that they are more than ever convinced that it is in the interests of London that the requisite augmentation to its supplies of water should be derived from some source other than the rivers Thames and Lea. Secondly, the Committee realise that, whether the Royal Commission are right or wrong in their opinion that river-water can be rendered perfectly wholesome by means of improved filtration, it is impossible to shut their eyes to the general movement of public sentiment against the use of river water. Thirdly, they are of opinion that, by getting the supply from Wales, the existence side by side of independent systems of supply will, in itself, be valuable. In order to place their views on the Welsh scheme (already detailed in our columns) on a firm basis, the Committee desire to expend 10,000*l.* in preparing plans and estimates for the presentation of the Usk portion of the scheme to Parliament in 1897. In the meantime, whilst the Council is for ever talking on this vital subject, the water companies are acting, and Parliament will probably recognise that fact. It was only on Tuesday last that a special general meeting of the West Middlesex Waterworks Company was held for the purpose of considering a Bill proposed to be introduced into Parliament to authorise the construction of new reservoirs at Staines—and the Bill will, practically, be a joint one of the West Middlesex, New River, and Grand Junction Companies—and the proposals were unanimously adopted. As time goes on it will cost more and more to buy up the companies, but this fact does not seem to be so important in the eyes of the London County Council as domestic disputes concerning the appointment of their clerks. If the Council will not move in the water question another body must, for instant action is imperative.

IT appears that, as the Palais-Royal at Paris is no longer an attractive centre, it is proposed to render it so by forming in the centre of the garden a Hippodrome or amphitheatre to seat 7,000 persons, and which will replace the former Hippodrome of the Avenue d'Alma, now removed. An official committee presided over by M. Roujon, the "Directeur des Beaux-Arts," has been discussing this scheme, which will take up 6,000 square mètres of the garden. In order not to interfere with the view of the surrounding architectural monuments, the upper galleries of the amphitheatre are to be on the ground level, and the track formed in a circular fosse ten mètres below. The stables, &c., will be subterranean. The effect of this will be to practically destroy an open garden which is a great boon to a crowded neighbourhood, and which has historical claims to interest also; and it is not likely that this installation of a circus in it will have any effect as a central attraction. The situation is out of the line of movement of Parisian life, which, as in London and most other large cities, tends continually westward. A circus at the Palais-Royal would be something like building a music hall within the precinct of the Tower of London.

* Since the above was written, we learn that the directors have refused to give the competitors any information as to the assessor's award, and that Mr. Shaw himself has been kept in ignorance as to the authors of the designs he selected. This looks very bad.

IT always seems a somewhat anomalous position for the liberty-loving trades unionist to be found petitioning the Government to prescribe his hours of labour. This was doubtless in the Home Secretary's mind when he received the deputation from the National Conference of Miners on the eight hours question last Monday. So far as the shortening of hours tends to secure men more opportunity for education and relaxation, and to allow of more time for carrying out precautionary measures against accidents—a new point urged by the deputation referred to—all parties are at one. But when the element of compulsion is introduced, and the trammelling of adult labour demanded, it becomes doubtful whether the means proposed to be adopted are the best for securing the desired end. For it is, after all, practically a wages question, and as such should be settled by agreement rather than by legislation. Sir Matthew White Ridley's own views are naturally against Parliamentary interference, seeing that he is closely connected with those sturdy non-contents, the Northumbrian miners. The arguments advanced on Monday were received with the usual assurance of careful attention, but the deputation can hardly have derived much encouragement from the interview.

AN ingenious attempt of the Savoy Hotel Company to defeat the operation of the London Building Act, 1894, Section 125, against "sky-signs" has fortunately been frustrated in the Law Courts. The Company erected an ordinary "sky-sign," and then placed a board behind the letters. It was, therefore, contended on their behalf that under these circumstances they were not infringing the Act, since the definition of "a sky-sign" is "any . . . word . . . or representation in the nature of an advertisement . . . which shall be visible against the sky." The idea of those who erected this particular advertisement evidently was that the letters themselves constituted the sign, whereas the statute is so worded as to include the entire representation. But even if the section had merely applied to letters, it is obvious that this advertisement would have been illegal, since the letters are equally visible against the sky though there is a board behind them. The sky forms the background against which the letters placed on a board are seen, just as a wall is the background against which a picture is visible.

THE case of Touzeau *v.* the Slough Urban District Council should be a warning to sanitary authorities of the loss to the ratepayers which may be occasioned by an improper performance of the duties of a sanitary authority. For this Council has by this decision been condemned to pay damages and legal costs in consequence of injury to the plaintiff by reason of an insufficient sewer. As far as can be gathered from the reports of the trial, a sewer of the defendants' was not large enough for its work, consequently there ensued overflows and smells, which, it was decided by the jury, caused so much illness in the plaintiff's family that he was obliged to leave his house. The defect seems now to have been remedied, but this fact emphasises the necessity for prompt action on the part of sanitary authorities when any portion of the system under their charge is defective. Unfortunately, local sanitary authorities are too apt to forget the useful maxim that "a stitch in time saves nine." For, in the present instance, if a sufficient sewer had been put down at an earlier period there would have been no damages and costs to pay, amounting probably to some 700*l.* or 800*l.*, which will have tö come out of the ratepayers' pockets.

DR. OHNEFALSCH-RICHTER is to give four lectures at the Imperial Institute, on successive Tuesdays commencing March 3, on "My Twelve Years' Stay in Cyprus." The first lecture will deal with the present state of the island and its ancient buildings; the second with excavations and antiquities discovered; the third with survivals of Homeric and Classical custom, and the concluding lecture with Biblical customs as illustrated in Cyprus antiquities.

IT has already been mentioned in our columns that M. Bailly, the late eminent French architect and President of the "Société des Artistes Français" left by his will a fund for an annual prize for the author of the best work on architecture. The Académie des Beaux-Arts, with whom the adjudication of the prize rests, have awarded it this year to M. Charles Normand for his publication entitled "L'Ami des Monuments," which has had a considerable effect in turning attention to the value of the ancient architectural remains of France.

IN the course of some remarks that followed the reading of a paper by Mr. Drummond-Milliken at the meeting, on Tuesday, of the London and Middlesex Archæological Society, it was pointed out that Pennant's statement that Inigo Jones built the Rolls Chapel rests upon very slender basis. It appears, indeed, that each of the particulars given by Pennant—namely, the building by Jones, the date 1617, the consecration by Bishop Mounteigne, Donne's sermon, and the cost, 2,000*l.*, apply equally to the building of the Chapel in Lincoln's Inn, as is shown by records belonging to the Inn. The Deputy-Keeper of the Records, Mr. Maxwell Lyte, stated that the recently discovered thirteenth-century chancel-arch, which has a span of 26 ft. 4 in., and radius of 15 ft. 6½ in., struck from two centres, will be restored *in situ*, but is to be lifted up about 18 in. The south door forms an epitome of the successive alterations the chapel has undergone. Its sill is 2 ft. below the present ground level, the tympanum of the arch was filled with an iron lattice, and then, later, with brick, the rest of the doorway being blocked with courses of tile and broken stone. We understand that Mr. Maxwell Lyte is about to prepare an exhaustive departmental report upon the chapel and its demolition, to be copiously illustrated with drawings to scale made at the Office of Works. A model of the chapel, as we have known it, might be deposited in the promised Record Office Museum. The writer of the paper directed attention to a little-known fact in the chapel's early history, which also may determine the question of its dedication. In 1275—that is, forty-two years after it was built—Edward I. directs John de St. Denny, Custos of the Domus Conversorum, to perfect the Chapel of the Holy Trinity of the Domus by taking stone from the side aisles thereof for the lengthening of the body of the chapel. A clearstory seems to be indicated in the drawing—made *circa* 1260—of the chapel in the MS. of Paris's "Chronicle" at Corpus Christi College, Cambridge, and a chancel, too, with east window of three lancets; but one cannot, of course, regard the drawing as authentic in every point, though it does delineate a tower where in later years the square stair-turret stood.

THE Purification of Water by means of Metallic Iron was the title of a paper read before the Society of Arts, by Mr. F. A. Anderson, B.Sc., on Wednesday last, the 12th inst. The paper was interesting to those who are not familiar with the use of iron in the connexion indicated; but the title was badly chosen, inasmuch as the author dealt principally with "Anderson's Revolving Purifier," and the success achieved by that machine in various parts of the world where it has been adopted. The idea of purifying water by agitating it with metallic iron was due to Sir Frederick Abel, and was suggested to him by the difficulties of the water-supply of Antwerp. Dr. Anderson devised the machinery for rendering the process prac-

ticable on the large scale. The revolving purifier is a cylindrical vessel, either of cast-iron, or built up of plates like a boiler, supported horizontally upon hollow trunnions, through one of which the water to be purified enters; after traversing the cylinder it leaves by the other trunnion. A quantity of scrap iron is placed within the vessel and as it slowly revolves this is caught up by shelves projecting from the sides, and dropped through the water. The mere act of agitating the water in this way is sufficient to affect purification as far as this process can do so. In order that the water shall not pass too readily through the cylinder, its passage is impeded by a simple device, and the shelves are so arranged that the pieces of iron are fairly distributed throughout the length of the machine. During its temporary sojourn in the cylinder, the water takes up a small quantity of iron, and as this must be got rid of, it is filtered by means of sand prior to its being sent to the consumer. This was as the process stood some ten years ago, and no improvement of any note has been made since, except a means of aëration during purification. For large supplies the revolving purifier is exceedingly useful. Where smaller quantities of water are used, as in villages and mansion houses, however, we imagine that with hard water the well-known lime-softening process had better be adopted, for in the softening a large proportion of microbes are removed.

IN the last of his series of Cantor Lectures, Dr. Fleming dealt more exclusively with the employment of the transformer. After showing how the temperature of the iron core of a transformer could be got very approximately by measuring the resistance of the coils after twenty-four hours' working, he worked out a numerical example, illustrating how the all-day efficiency can be calculated in practice. The causes which produce loss of pressure were, he said, the resistances of the two copper coils, and the leakage of magnetism. An exceedingly neat and ingenious way of detecting this leakage, due to Mr. Mordey, was explained. A mercury and a spirit thermometer were placed near the transformer. If there were appreciable magnetic leakage then the mercury thermometer would give a higher reading than the spirit one, owing to the currents induced in the mercury by the magnetism heating it. Dr. Fleming's remarks on the increase in the core loss of transformers with time were very guarded. Whilst admitting that this loss did increase considerably in many cases, yet he seemed to regard it as due to some defect in the annealing of the iron used, and therefore as one that could be remedied. The capacity of mains was next considered, and he said that the capacity of mains which used paper for insulating purposes was less than the capacity of mains which used indiarubber, a fact distinctly in favour of using paper for insulating purposes. The importance of Lord Kelvin's discovery that alternating currents resided mainly on the surface of conductors, so that thick solid copper mains were unsuitable for alternating current work, was dwelt on, and a useful diagram of the losses due to this cause was given. The theory of electric resonance was given, and the many curious effects due to it were pointed out. He showed an interesting experiment illustrating the sudden rush of current that sometimes takes place on switching on a transformer into a circuit, and gave a mechanical illustration of the forced oscillations set up. His many hints for simplifying the mathematical difficulties of the theory were much appreciated, and his lectures have done much towards popularising a knowledge of the action of the transformer.

THERE is to be an exhibition of "Living Pictures" in May, provided by the "Healthy and Artistic Dress Union," which promises to be of more interest than such exhibitions usually are. It is under the general management of Mr. Henry Holiday, and the scenes are to represent dress "past, present, and future" (?): the past epochs represented including ancient Egypt, ancient Greece, mediæval Italy, eighteenth-century England, and several present-day scenes: what is to represent the "future" is not distinctly stated. The scenes will be arranged and the dresses devised by Mr. Walter Crane, Mr. Holiday, Mrs. Louise Jopling, Mr. Lasenby Liberty, and Mr. G. A. Storey. No trouble is to be spared in the archæological presentment of the past epochs. There will be three repetitions, but the precise dates are not fixed yet. Is the costume of ancient Egypt to form an example for "healthy and artistic dress"? It was both, no doubt, in its own time and climate, but somewhat scanty for modern ideas.

A BUILDING Trades' Exhibition is to be held at St. James's Hall, Manchester, from April 20 to May 9. It will include, besides the usual exhibits of materials and inventions, arts and crafts in operation. In order to provide for the effective arrangement of the whole the managers have commissioned Messrs. Darbyshire & Smith, architects, to make a comprehensive plan for the placing and arrangement of the exhibits. A special section will be set apart for a collection of drawings and designs of important buildings in England and abroad. Messrs. Darbyshire & Smith will also superintend the hanging of these. Mr. Albert P. Baker is the General Manager, and as we understand that no exhibition of this kind has been held in Manchester and its neighbourhood for ten years, there is room for an important one now.

A CORRESPONDENT sends us a charming specimen of architectural advertising by a certain architect in a large midland town, whose doings in this way have before come under our notice. This gentleman has now got out a printed sheet containing on the front page lithographs of two of his buildings, followed on the next page by statements as to his knowledge of acoustics, his excellent central situation for the supervision of work, and the value of his books in relation to one class of building, in regard to which "hundreds of letters have been received by the author" &c. Then follows a list of buildings carried out. The best bit of the broad-sheet, however, lies in its final statement—"Lithographic views, &c. (if in stock), sent free on application." The author seems to have been determined to omit nothing which could degrade the practice of architecture to the level of a mere trade. We should imagine, however, that he has overshot the mark. The public know a little more about what an architect should be than formerly, and such a circular would be likely to repel a good many more than it attracted.

ROMANESQUE ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

ROMANESQUE is the architecture that was produced under the sway of the barbarians who overran the western part of the Roman Empire; after they had embraced Christianity: some of it was possibly built by the barbarians themselves when they had settled down long enough to have learnt the elements of architecture. It is, however, difficult to be sure of this, and much less can we be sure of the particular tribe to which the builders belonged, for we know that all the tribes of savages and barbarians were accustomed to league themselves together for the purpose of conquest. After the first conquest, the most powerful or most able tribe gave their name to the part conquered, and we may be sure, even without further evidence, that the first conquerors were utterly unable to build any monument, and, therefore, must have got them designed and built by Romans or Byzantines. The Goths and Vandals who plundered Rome spared the lives of the people, that is, they did not indulge in an indiscriminate massacre.

Theodoric the Great, when he became ruler of Italy, 489 A.D., was wise enough to employ Symmachus, a Roman noble, and Boëthius, the philosopher, as his agents for carrying out repairs to the public monuments at Rome and elsewhere, and probably to get the new monuments at Ravenna erected for him. A letter Theodoric addressed to Symmachus about the repairs to Roman monuments is still extant, as well as the ruins of his palace at Ravenna, and the tomb erected to him after his death.

The Gothic Empire was extinguished by Belisarius in 539, and for a time was under the dominion of the Emperor Justinian.

Alboin, King of the Longobardi, or long beards, at the head of the Lombard tribes and their allies, took Milan in 569, and Pavia in 572, and made the latter city his capital. The Lombards eventually overran nearly the whole of Italy.

Alboin is represented as being a mild ruler, but his death was owing to his forcing his queen, Rosamond, a daughter of the King of the Gepidæ, whom he had slain, to pledge him in a cup made of her father's skull. For this outrage she had him assassinated. The Lombards were great builders in the sense of ordering buildings, though at first they mostly employed the architects and builders from Como and the neighbourhood, called Magistri Comacini. The importance of these architects and skilled workmen was so great to the Lombards, that even a tariff of their charges for work, as well as the legal aspect of the risks they ran in building, and the fines for killing them, were included in the Lombard laws. The Lombard rule lasted from 569 to 774, when the last king, Desiderius, was dethroned by Charlemagne, and Lombardy became an appanage of the Frank crown, though it was still governed by the Lombard laws. You may possibly recollect my mentioning in my Byzantine lectures that we know that the lower part of Italy was called Lombardy in 937 A.D., from an inscription on the Church of St. Mary, the Mother of God, at Salonica, humorously called St. Bardias.

I have no intention of making these lectures archæological; I am merely going to point out the deviations effected under the sway of the barbarians, by which the Roman and Byzantine styles were turned into that new style we now call Romanesque, and which in certain countries was ultimately developed into Gothic. The object of all my lectures has been to urge the rising architects to try to put the breath of life into architecture, so that it may again become a progressive art. I cannot give you a rule for doing it; I can only quote Professor De Morgan's retort when he was asked to explain how Napier hit upon the invention of logarithms, that "he must be a great man who can give a rule for making inventions"; but I hope that Sir Joshua Reynold's remark may be true, that "it is by being conversant with the inventions of others that we learn to invent."

I beg of you not to think that it would be a slight achievement to make architecture a living art again. Even now there are at least a few persons in the United Kingdom who admire architecture, who have made themselves acquainted with its principles, and who would hail with delight its revivification, and it is from such that the ultimate decision must come. When once they announce that architecture is alive again, the rest will be gradually brought to see it, and the new architecture will be universally called for. All the architectural talent of the country would then be turned into the right direction, instead of being frittered away in individual efforts in all directions. Architectural forgery would cease, and the antiquaries of a future day would be able to give the date of each of our buildings as they now can that of the Gothic ones; and the æsthetic philosophers of the future would be able to portray that phase of the national mind that architecture represents.

If "the fine arts are the mirror of a nation's civilization," we have no native architectural mirror now, for we have not even a moulding we can call our own; and seeing that this leaves one part of our national character quite in the dark, we must deplore it. This music of the eye is as important to sum up the character of the nation as the music of the ear, as poetry, eloquence, painting, sculpture, and the pursuit of science. Philosophers will hereafter arise, who will read the character of a nation from its architecture, and more completely if it be adorned with architectural sculpture. How pleased we should now be, if we had such philosophers, who could picture to us

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the souls and thoughts of the barbarians who adorned their places of worship with that rude sculpture, and with those strange animals that devour one another.

Much as I despise antiquarianism when it usurps the place of architecture, I am most grateful to the antiquaries when they devote their inquiries to the proper end; for without them whole epochs would be blank for us. They have in many cases preserved ancient work for us, as well as drawings of things that have perished; but above all they have by their acute observations and comparisons of buildings, aided by the study of authors and of MSS., tried to assign all monuments to the exact epoch in which they were created. This, at first sight, may seem a small matter, but any great error in date makes us take a wrong view of the epoch, and lands us in unutterable confusion. As we know how Roman buildings were studied at the Renaissance, and ancient authors were ransacked for hints and descriptions, we may well be surprised that no one ever published his suspicions that the present Pantheon at Rome was not the one built for Agrippa till Fergusson's day; yet this shows what a wrong estimate had been formed of the architectural attainments of the first century B.C. And now M. Chedanne's researches have shown us that it could not have been earlier than the time of Hadrian (117-138 A.D.)

Even if I knew the names of all the foreign architectural antiquaries who had written on Romanesque, a list of them would be much too long to give, though I may mention Texier, Gailhabaud, De Caumont, Viollet-le-Duc, Ruprich-Robert, and Cattaneo, and we have a superb monograph on Lombard architecture by M. F. De Dartein, with illustrations measured, drawn, and engraved by his own hand. Through his kindness I have been permitted to illustrate this lecture from his book.

To get an adequate idea of the architectural skill and knowledge displayed in the buildings erected under conquering barbarians we should know the nearest buildings of importance that had been erected during the lifetime of the architects of that day, what may be called the current programme of the sort of building and many other things that it is now almost impossible to know. Now little remains but cathedrals, churches, chapels, and baptistries, except a few towers and fortifications, from which we can try and extort the information we want. But here again we are met by new difficulties, the inscription or the charter may point to earlier or later times; the inscription may have belonged to an earlier period, or even have been copied from one, as that on the frieze of the Pantheon at Rome, or the charter may speak of a building on the same site pulled down and rebuilt long afterwards. We can, however, generally learn something from the history of the times that might make it probable that architects, artists, and skilled workmen were attracted to certain building centres, and were driven by troublous times from other centres to remote ones. For example, when Constantine was at Thessalonica, building must have been rife at Byzantium, when he made it the capital of the Roman Empire. The overrunning of Syria and Palestine by Chosroes II. must have caused an exodus of the population, and architects and skilled workmen were probably among them, and there must have been a new attraction when the ruined buildings there were rebuilt or repaired under Heraclius. When those countries, and other parts of the Roman Empire were subjugated by the Saracens in the seventh century, there must have been a great flight of the inhabitants as well as slaughter, as all pagans were butchered without mercy, and that sword of the devil, Kalid, ground all the corn of the Saracen army for three days with the blood of the Persian captives after the battle of Allis.

The iconoclasm of Leo the Isaurian and his successors in the eighth and ninth centuries must have driven out most of the painters and sculptors to seek their living elsewhere.

The only Romanesque building of the Goths that I know is a brick structure at Ravenna, called the Palace of Theodoric,* which you have just seen, with a tall arched doorway in its centre, and a wide opening above it, flanked with columns, and on either flank of the upper story four stilted brick arches, supported on marble lintels, with a column without a base under each lintel. These columns stand on a continuous slab or narrow balcony supported by plain corbels. This building, however, bears no resemblance to the Palace of Theodoric in the mosaic of St. Apollinare within. The tomb of Theodoric also remains, which was probably built shortly after his death in 526 A.D.

I will now speak of the Lombard Romanesque. Alboin made Pavia his capital in 572 A.D.

There were many variations in the plans of churches during Romanesque times. Some of the alterations were owing to changes in the ritual, some were made for the sake of convenience or comfort, and some were due to structural reasons. One of the most striking of these variations due to the ritual was the forming of an apse at the end of each aisle. This subsidiary apse is called by the French Absidiole, and this was due to the dedication of each aisle to a separate saint, thus turning the single church into three conjoined churches, the apse having become the sign of a church. This change in the plans of churches did not apparently take place in Europe till the eighth century, the first, I believe, being at Sta. Maria in Cosmedin at Rome, which has three apses, and was built between 772 and 795 A.D. This church is vulgarly called La Bocca di Veritá—the mouth of Truth—owing to the sink stone of an ancient gully, pierced so as to resemble a human face, being put upright in the portico or narthex, and to the mouth being used as a letter-box for anonymous denunciations. The introduction of presbyterial crypts caused a striking alteration in churches, by raising the chancel considerably above the level of the nave, which had to be reached by flights of steps, while another flight led into the crypt, the high altar being placed on the floor of the chancel over the spot where the body of the saint was buried; as at San Lorenzo Without at Rome, St. Ambrose at Milan, San Miniato at Florence, and elsewhere.

The shifting of the high altar from the front of the apse to the crossing of the nave and transept, and raising a lantern or a dome over it, was a Byzantine device, supposed to have been learnt from the churches of the Hauran, and is described in Procopius at the rebuilding by Justinian of the Church of the Holy Apostles at Constantinople. The Church or Baptistry of St. George, at Ezra, in the Hauran, has a dome, oval in section, over its centre, and is supposed to be of about the same date as the Church of the Apostles. Some say the invention was that of the Hauran architects, but, be that as it may, the device of getting light into the centre of churches was found as useful inside, as the dome, lantern, or tower, was effective outside. The carrying-walls, in continuation of the sides of the apses, to protect the monks from draughts during the night services, may be seen at the church at Alliate (881 A.D.), at San Ambrogio, at Milan, probably of the ninth or tenth century, and many others. Some of the structural devices are as follows:—The insertion of piers in the nave between every two or three columns, partly to save centering, and partly to make the arcades more secure, may be seen at Sta. Maria, in Cosmedin, at Rome, and elsewhere. Columns were also found to be illogical forms for resisting the thrusts of arches or vaults, so the architects made compound piers with attached columns to resist these thrusts. The first instance of such compound piers is supposed to be in the ruins of the church of St. Aurona at Milan, found while excavating in 1869, supposed by some to have been erected in the eighth century, and by others in the last years of the eleventh century. The same forms of piers are found at St. Ambrogio, at Milan, whose date is equally uncertain, and similar forms of piers are found at the churches at Pavia. By another logical process, these attached columns are made to carry down important members of the vaulting, such as the wall and diagonal ribs.

Another of the great inventions or modifications in Romanesque times is the grasping of the fact that a column or pilaster in Roman times was used to support something, and regardless of all precedent as to the ratio between the height and diameter of columns, the architects carried up thin external shafts or pilasters to the top of their buildings, while inside they often run up continuously to carry the wood trusses of the roof.

On the front of St. Lanfranc, near Pavia, the shafts rise from the ground up to the bottom of interlacing arches under the gable cornice, each column taking two of the arches; the same takes place at the apse of St. Julia at Bonate, at San Abondio, at Como, and at Sta. Maria del Tiglio at Gravedona.

We are naturally interested in Pavia, because Lanfranc, who was born there of a noble family, became Archbishop of Canterbury under William the Conqueror, and Regent during his absence, and was the founder or restorer of many cathedrals, churches, and abbeys in England. He probably got his architects from Pavia, or, if he did not, he must have wanted his churches to be like those of his native town. His family name is immortalised there by a church near Pavia dedicated to an Archbishop under the name of San Lanfranc. St. Michael at Pavia has a striking front, with sculptured bands at intervals on the lower part, and here and in other parts of Lombardy raking arcades were made under the front gable, as may be seen in the front of the Cathedral of Parma.

Native architecture has always this charm, that you not only see how natural difficulties are overcome, but how the overcoming them often starts a new style of building, and among a tasteful race causes the production of new æsthetic effects. Strabo tells us that the absence of good timber, the presence of bricks and asphalte, made the Babylonians carry everything by means of piers and vaults, and no doubt this solid construction, that asphalte rendered impervious to water, suggested those hanging gardens which were one of the seven wonders of the world.

Like the Romans before them, as M. Choisy has shown us, the architects of Romanesque days grudged centring and turned their arches for thick walls, thus, they made the lowest ring about half the width of the wall, if only one step on each side was wanted, and about a third if two steps were wanted, and centred the first arch; when the first ring was turned and keyed, it acted as a centering on which the arch above was corbelled out until it was keyed up, and then this second ring acted as a new centre for the next. Professor Willis, curiously enough, called these steps orders. These stepped arches were often richly ornamented or moulded, and sometimes moulded and ornamented too, and formed one of the striking features of the Romanesque and Gothic styles.

We may roughly say that Romanesque was the attempt of the barbarians to get their buildings vaulted, so as to prevent their destruction by fire. It was in this struggle with narrow means, small knowledge, and constant failure, to turn inexpensive vaults over wide spans securely, and without ruining the building by their thrusts, that the wits of the various barbarians were sharpened.

I mentioned the raking arcades under the gable ends of cathedrals and churches, and I think this feature must have been adopted by the Lombard architects to get some deep shadows about their buildings, and thus to remedy the flatness of their elevations, for it was not only a favourite method of adorning the gable ends, but was used round the central lanterns or towers, and also round the apses; they also used as well in the apses semicircular openings sloping back to the inside walls, sometimes pierced at the ends as means of ventilation to the roofs, but as often as not merely blind. I am not sure that the arcades in the lanterns and apses were not structural to abut the thrust of the half domes of the apses and the central domes inside the lanterns, but in the fronts of churches and cathedrals they must, I think, have been purely used for effect; at least, it is not clear for what other purpose these open arcades on the gables could be used.

At St. Ambrose at Milan, the dome over the altar is carried on squinches, and is an irregular octagon, whose long axis is the width of the nave. Externally this is formed into an irregular octagonal tower of two stories above the roof of the basilica. The faces are filled with arcades on columns. The lower story of these has eight on the main face, with a pier in the middle; the sides have six also with a pier in the middle; on the loftier upper story the long face has five arches, the centre arch being taller than the others, and three on the narrower sides. The crowning member has lozenges at the bottom; interlacing circles over; above this, corbels; then two bands with dentils between with a tiled roof above. The floor of the lower, as well as the that of the upper arcade of the lantern abut the springing, while the vaults of the upper arcade abut the lower part of the dome; the front above the narthex has five arcades rising parallel to the line of the roof with carved archivolts, and slender shafts between each opening, whose caps bear two sides of the two arches of those forming the ornamental arcaded friezes. Friezes of single arches on corbels occur as well to each stage of the tower, and are the universal ornament under cornices and strings both on the insides and outsides of buildings. This feature seems to have been taken from the Byzantine work at Ravenna and elsewhere, and may be seen at the bell towers of Cremona, Modena, and elsewhere. It persisted in Italy,

* See our lithographic plate.

but mostly in the form of machicolations until the Renaissance, and may be seen on Giotto's tower, and at the Loggia dei Lanzi at Florence. St. Michael, at Pavia, has an irregular octagon dome on squinches, and is externally also formed into a lantern with two stories of arcades. A deep frieze above is also enriched by blank semi-circular arches, a trifle stilted, while the upper part of its apse is also formed into an arcaded ambulatory like most of the apses of about the same date. San Fidele, at Como, has an open arcade round the apse, as well as the Cathedral at Murano.

The great constructive problem the Romanesque architects had before them was to vault the wide spans of naves cheaply and securely. As the early churches had mostly thick walls there was no difficulty with the aisles, as they mostly had a triforium above them, and the lower story was vaulted with barrel-vaults with arris groins, after the Roman manner. When the naves began to be vaulted, they were mostly with quadripartite vaults with ribs, and domical in shape, after the Byzantine manner. The naves were made twice the width of the aisles, so that one square bay of the nave made two square bays of the aisles, and the piers that bore the nave-vaulting were much larger than the intermediate ones that only took the vaulting of the aisles and triforium. To resist the thrust of the nave-vaults the external walls were mostly heavily buttressed, and over the transverse ribs of the aisle and the triforium, walls were carried up to the soffit of the roof. At St. Ambrose, Milan, the roof covered nave and aisles in one slope; but this was found to make the nave gloomy, as all the light, except from the west end and lantern, came from the windows of the aisle and triforium. At St. Michael, at Pavia, the aisle roofs were kept a little below the main roof, so as to get two little windows under the wall-rib in the nave wall, over the face of the triforium. Parma and Modena Cathedrals and other Lombard churches with wide naves had iron ties to hold in the abutments. At Parma the bays of the aisle were square, and the nave vaulting oblong.

In a warm sunny climate like Italy shade and coolness is pleasant for a great part of the year; the sun is more intense, and the air clearer than in colder and more misty climates, so that the second grand problem of how to well-light great and tall naves was to be looked for further west.

THE ARCHITECTURAL ASSOCIATION:

TECHNICAL INSTITUTES.

THE ordinary fortnightly meeting of the Architectural Association for the present session took place on the 7th inst., in the Meeting-room of the Royal Institute of British Architects, Mr. F. T. W. Goldsmith (Vice-President) in the chair, in the unavoidable absence of the President, Mr. Caröe.

Messrs. A. E. Corbett, E. W. Sloper, and H. Tanner, jun., were elected members of the Association.

Mr. A. H. Hart (Junior Hon. Sec.) stated that the President and Mr. Fletcher had represented the Association at Lord Leighton's funeral in St. Paul's Cathedral.

It was also announced that the second Spring Visit would take place on the 22nd inst., to the house in Park-lane situated at the corner of Aldford-street. A visit will afterwards be paid to the new Claridge's Hotel, now being erected in Brook-street, Grosvenor-square, by kind permission of the architect, Mr. C. W. Stephens.

Mr. Sidney H. Wells, Principal of the Battersea Polytechnic, next read the following paper on "Technical Institutes":—

My presence here this evening is due to a suggestion from one of your past Presidents, Mr. Mountford, that I should contribute to your proceedings from my experience in the requirements and working of technical institutes. The exact nature of my contribution and its title was suggested by your Secretary, and the latter certainly possesses at least one advantage in giving freedom in writing, for I suppose no two words in our language are used to convey so great a variety of different meanings as those by which my paper is called.

I presume I owe the request to my close connection with an institute of this class, to the fact that the spread of technical education in this country is calling teaching institutes into existence on every hand, and to a very natural desire on the part of architects to know more of the conditions which they are required to fulfil.

In preparing this paper, I assumed that you did not wish me to speak of technical institutes from their artistic or elevation aspect. Whether or no it is true that "the best view of architecture is from the back," it is certain that from the educational standpoint the best part is its plan, and it is to this I shall confine my attention.

For obvious reasons you will not expect me to speak of plans as influenced by the shape and size of the site. I am fully mindful of the difference between the arrangement of a successful plan on an open and regular oblong plot as at Battersea, or on the side of a slope with a narrow frontage and sides closed in by buildings as at Birmingham; in a curious triangular plot as at Clerkenwell, or on the irregular area of the Holloway site. Nor shall I attempt anything so impossible as to describe a plan suitable for any institute, in whatever part of the country it may be built. On this question, the absolute importance of which is, I am afraid, not always sufficiently realised, I can only urge the necessity for a close study of the needs of the locality before the building is commenced. The size and arrangement of rooms suitable for the metal-working industries of Birmingham would be ill adapted for the chemical workers of St. Helen's. Institutes for the tanners of Bermondsey, the furniture-makers of Shoreditch, the engineers of Woolwich, or the building artisans of Battersea require very different arrangements. It is not enough to provide a certain number of rooms and trust to chance that they will be found suitable, nor to too closely copy the plans of some other building. I only know of competitions being open by the number of architects who visit Battersea.

There are, however, very many important matters which are common to all technical institutes. The ordinary subjects of pure and applied science find a place in all their curricula; workshops and domestic economy workrooms are seldom absent; art, music, and commercial subjects are commonly included, while they all require the same provision for administrative and general functions. Institutes of the class of polytechnics with which I am now connected, only differ from others in their inclusion of provisions for social and recreative work, and the greater number and variety of subjects which they teach. Hence, I feel less diffidence than I otherwise should, in taking as my model a polytechnic institute, and in drawing my chief illustrations from it. It will, however, be my aim to make my remarks as general as possible, and capable of application to any institute with which you as architects may be called upon to deal.

For convenience in treatment I propose to divide the requirements which a technical institute may be called upon to fulfil into the following sections:—

(a) *Educational.*
(b) *Administrative.*
(c) *Recreative and Social.*
(d) *General.*

Appendix A is a complete statement of the usual provisions for these sections, omitting ordinary class-rooms, as found in an institute of the polytechnic class. It shows the number and character of the different rooms required for the several departments, their most suitable position in the building, and relatively to each other; the rooms which require special provision in the way of lighting or ventilation; those which require power for driving machinery or strong floors with freedom from vibration; those in which the work carried on is necessarily noisy and likely to disturb other classes, and those in which fireplaces should be fitted, in order that they may be used in cold weather when the heating apparatus is not in use, as during vacations. It also distinguishes those rooms which are *essential* from those which are *conveniences*, and may be dispensed with in case of need, the latter being printed in italics. It groups together those rooms which should be *near to* each other, while those rooms which it is essential to have *next* each other are shown by being bracketed together with square brackets. In all such cases the rooms marked *d* should have a door to allow of direct passage from one to the other, in addition to separate entrance-doors.

Appendix B is a complete list of rooms at the Battersea Polytechnic, showing size and accommodation. It is included with the view of rendering assistance in fixing the size of rooms. It would appear from the column in Appendix A, showing the position of the rooms in the building, as though the institute would be made up almost entirely of a ground-floor. To this criticism I can only say that my experience at Battersea and my knowledge of other institutes leads me to believe that the position I have shown is certainly the best if it can be secured. After what I have already said as to different requirements of different institutes I need perhaps scarcely do more than point out that Appendix A does not pretend to specify the exact number of rooms required in the several departments. This must obviously depend upon the number of students.

The importance of a convenient grouping together of the different rooms which constitute one department cannot be over-estimated. Students are kept better under supervision with a fewer number of teachers; time is not lost in the transit of apparatus and materials, or in the passage of students from room to room, the contents of the room are better safeguarded, and the whole department is more economically and efficiently managed.

Before dealing with the requirements of the different departments it will be convenient to speak generally of those rooms which are similar in character and common to several departments. In this consideration, as, indeed, in all, it is necessary to remember that, although technical institutes are chiefly used by adult students (sixteen years of age being the usual minimum) they are being increasingly used also for day schools, where the students are from thirteen to seventeen years, or even in some cases younger. The special provisions necessary for such use will be pointed out.

Lecture-rooms. — By lecture-rooms is meant rooms in which the lessons given are accompanied by experiments, or the display of apparatus, models, and diagrams, as in the case of nearly all science and technical subjects. In such rooms more space is required for the lecturer and the lecture-table than in ordinary class-rooms, and the desks should be arranged in the form of a rising gallery, so that all students may command an uninterrupted view of the lecture-table. The rise of the seats may be from 6 in. to 12 in., and should increase towards the back, so that the seat-tops form points in a rising curve, instead of in a straight line. As a general rule the construction adopted does not allow the space under the gallery to be usefully utilised, although there is no reason why it should not be converted into store-rooms, if not, indeed, into something more valuable. In the Birmingham Technical School this space has been converted into very convenient rooms or galleries for optical work, for which purpose they are well suited, as no natural light is required. The galleries have a greater slope than at Battersea, having a rise of 8 ft. from front to back, with seven or eight rows, but this is distinctly an advantage, and, of course, adds considerably to the space underneath. One of the most convenient gallery-seats I have seen is in the Science Block of the Leys School at Cambridge, where each seat is 14 in. above the one below it. The question of whether the seats should be arranged in long, straight lines parallel to the lecture table, or grouped in three rows around it, depends chiefly upon the shape of the room. If the lecturer faces the long side of the oblong, the latter arrangement is preferable; but if the short side then the former. At Battersea the chief lecture-rooms are 34 ft. wide and 42 ft. deep, and the lecturer faces the short side, so that long, straight seats give all that is desired; whereas at Birmingham the rooms are 46 ft. wide and 34 ft. deep, and the lecturer addresses the long side, so that the seats are arranged around the lecture-table.

With regard to the important question of the size of lecture-rooms, my experience leads me to the opinion that, as a rule, they are made too large. The ordinary evening classes in such subjects as chemistry, physics, mechanics, building construction, and practical geometry, ought not, in my opinion, to exceed from forty to fifty students. For casual popular lectures, or for literary and general subjects, it is, of course, as easy to efficiently lecture to hundreds as to twenties; but when it is necessary for each individual student to closely follow the lecturer in all he says and does, as with experiments and demonstrations, and when, moreover, the lecturer should maintain a good grip of his class, and should teach, not merely lecture, then such numbers as forty or fifty form a reasonable limit. Of course, this means a greater number of classes, but of its greater efficiency there is no doubt. It must also be remembered that if elementary classes are large, advanced classes are usually small, and it is anything but effective to lecture to a class of a dozen or score students, in a room with accommodation for ten times that number. As bearing on this point, I may say that the average number in eighteen evening-classes at Battersea which are held in lecture-rooms is eighteen, the largest number being forty-six, and the smallest

four. For day-classes the numbers average from thirty to fifty-five. From enquires in other institutes, I find that evening lectures with an average attendance exceeding fifty or sixty are an exception.

It is, however, advisable to have one lecture-room, with seats for a larger number than mentioned, especially if there is no great hall, as it is very useful for general meetings of students, popular lectures, &c. This room should be attached to the department which is likely to receive the greatest number of students.

At Battersea our two largest lecture-rooms are 34 ft. by 42 ft. and 34 ft. by 42 ft., less a corner 12 ft. by 7 ft., and contain seats for 154 and 140 respectively. In two smaller theatres, one is 33 in. by 21 ft., with seats for 72; and the other is 40 ft. by 25 ft., with accommodation for 81. They are in no sense crowded, and in the first three cases have gangways of 3 ft. 6 in. to 5 ft. 6 in. wide along one side to allow of entrance and exit. The lecture tables are from 2 ft. 3 in. to 2 ft. 8 in. wide, with a distance of 4 ft. 6 in. to 5 ft. between the table and the blackboards behind, and distant 3 ft. 6 in. to 5 ft. from the nearest row of seats. Gangways of 2 ft. 6 in. to 3 ft. width between ends of seats and walls, or of 2 ft. between seats themselves when in separate lengths, are found to give ample space. At Birmingham the chief rooms are 46 ft. by 34 ft., with seating accommodation for 210. (In these measurements a length of 20 in. is allowed for each student.)

In all lecture-rooms for science and technical subjects, provision should be made behind the lecture-table for large blackboards, for the display of diagrams, and for a lantern-screen, the lantern being easily worked from the table if fitted with a short focus lens. It is also necessary to provide for a supply to the lecture-table of gas, hot and cold water, and, if possible, also of steam, with necessary sinks and wastes.

It is not necessary to provide a preparation-room next the lecture-room except for chemistry, although for other subjects they would be very convenient, and could usefully serve as stores. In the case of large departments it is customary to provide a second and smaller lecture-room with seats or galleries, but with less elaborate fittings. This is used for lectures to small classes, and for exercise classes.

Class-rooms.—In institutes for purely technical work, there is not a large demand for ordinary class-rooms, except for such subjects as mathematics, exercise classes, and for lessons without experiments. This, however, is not the case with the ordinary institute, and certainly not with polytechnics, where the curriculum includes classes in languages, commercial, literary, and general subjects. My experience is that in most institutes the number of ordinary class-rooms is insufficient, and this point is especially important in view of the utilisation of the institutes for day-schools. For such work the provision of a sufficient number of ordinary class-rooms is an absolute necessity. They need no special fittings beyond plenty of blackboard surface, a small platform and table for the teacher, and ordinary desks with seats or chairs for the students. The most convenient arrangement of seats is undoubtedly some form of dual desk, with sufficient space between each to allow of the teacher passing from student to student, as, although this is not required for languages and literary subjects, it is very desirable for mathematics and exercise classes, and is a necessity for day school work. This feature, which applies equally to lecture-rooms, is also important as permitting the room to be used for drawing-classes, or other subjects where individual attention is necessary, and for this reason we have at Battersea adopted short desks, with gangways between, in preference to long continuous desks, for the two lecture theatres (Engineering and Physics) which we fitted last summer. We have six ordinary class-rooms, two of which contain dual desks, with fixed seats, while four are fitted with long desks and chairs.

Much of what has been said with reference to the size of lecture-rooms applies also to class-rooms. For efficient teaching it is not advisable to exceed thirty or forty in number. The former of these numbers is certainly a limit where the students require individual attention, and with only one teacher; whereas in other subjects, such as literature, theory of music, and shorthand, it is possible to take larger numbers, say up to fifty, although these would be unusual numbers for such classes in the ordinary technical institute. Class-rooms should therefore vary in size to accommodate numbers from, say, thirty to fifty, and if they do this they will meet all the ordinary conditions of both evening classes and day schools. At Battersea two of the rooms are 22 ft. 6 in. by 18 ft., and provide seats at continuous desks for thirty each. Two other rooms are 24 ft. 6 in. by 20 ft., one having dual desks and the other long desks; the former accommodates forty, and the latter forty-four. Another room, 22 ft. 6 in. by 30 ft., contains twenty-six dual desks. In these rooms the gangway from end of desks to walls is 24 in. to 28 in., and the nearest desk is removed from the blackboard, thus giving ample room for the teacher. These figures give an average of 12 to 13 square feet per student, which has certainly proved to be ample.

It is not possible to say how many such class-rooms should be provided in any particular institute without knowing to what extent non-technical subjects will be taken, and the probable size of its day school. We should find it convenient at Battersea to possess two more such rooms than we have. Another point relating to the size of class-rooms is worth considering. In the Science and Art Department examinations, which are usually the chief ones of the year, two superintendents are required for any number of students up to and not exceeding fifty. The students must be spaced 6 ft. apart in all directions, except for some art subjects. For the sake of economy it is not advisable to give less than fifty students to two superintendents, and this requires large rooms. Lecture-rooms with gallery seats are not accepted for examination purposes. At Battersea certain of the class-rooms are divided by roller-shutters, and we have found it very convenient to be able to make these into one large room for examination purposes. I am, therefore, inclined to recommend the division of certain class-rooms in this way, especially if double shutters with an air space between are fitted.

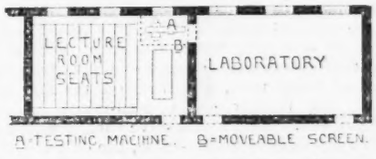
Workshops and Workrooms.—I refer to these together because of the fact that the most important consideration affecting their size refers equally to both. It is becoming generally recognised and accepted that the number of students under one teacher in practical classes should not exceed fifteen, and here, then, is an important point to start from. The same workshop can seldom be used for more than one subject; if, then, there are, say, sixty students for practical plumbing, and a small workshop, and they are accommodated in four classes, the workshop is used on four evenings per week, whereas if they are taken in two classes, the shop is standing idle for four working evenings each week. Extend this illustration to ten or a dozen workshops, and you will see how large a part of the building may be practically unused when the shops are of large size and the classes are small. As a practical instance of this, let me quote our position at Battersea, where we have one workshop unused on five evenings each week, six on four evenings, and two on two evenings, these nine shops alone covering an area of 5,960 square feet. The question will naturally be asked—Why, then, not split the numbers to form a larger number of smaller classes? The reply to this is, that the working expenses are less with large classes than with small, owing to the fact that the second or third teachers are usually assistants who receive a less salary than the head teacher, whose presence is advisable in all the classes, and that the cost of fires, lights, preparation, &c., is less with, say, two large classes than with four small ones. There is also some difficulty in securing the services of the same teacher on more than three or four evenings per week. Another very important point is that in some practical classes, notably in brick-cutting, the work done by the students necessarily occupies considerable space, and cannot easily be moved from the bench to make room for the work of a student coming on some other evening. Hence in such a subject the use of the workshop by different classes on different evenings is not practically convenient, and if the students are large in number it is advisable to provide a large shop. This, however, does not apply in cases where the work is small and can be easily moved, as in plumber's work, masons' work (unless work is executed full-size), fitting and machine shop, smiths' shop, woodwork generally, and in electrical work. It does apply, though to a less extent than in brick-work, to plasterers' work, and to painters and house-decorators' work.

Very many of these remarks apply to work-rooms for domestic economy and other subjects, as "men's tailor-cutting." There is, however, one important difference in the working of the classes which bears upon the size of the rooms. Workshop classes usually occupy the whole evening, the students receiving their theoretical instruction on some other evening and in larger classes. But in cookery, laundrywork, millinery, needlework, and dressmaking, the practical and theoretical instruction is given on the same evening, the latter being of the nature of a demonstration, and immediately preceding the former. There is, of course, no reason why a larger number should not be taken for the demonstration lesson, but this is not usually convenient, and the subjects are generally worked with classes of fifteen. Domestic economy workrooms are more available for several subjects than are workshops, as, for example, the same room can be used equally well for any of the needlework subjects.

All shops and rooms for practical work should, therefore, be made large enough to accommodate fifteen students, or whole multiples of that number. It is obviously uneconomical to work such classes in numbers of, say, twenty or twenty-five, as two teachers would be necessary, and they could as easily take thirty. In view of day school work, the fitting and machine shop and carpenters' should be large enough for at least thirty students.

Laboratories.—The number of students allowed to one teacher in laboratory work is twenty, but it is usual to find laboratories with accommodation for larger numbers, owing to the fact that laboratory classes are usually preceded by a lecture, and that it is convenient to provide for the students who have attended the lecture to proceed immediately afterwards to the laboratory. The space per student in laboratories must be larger than in class-rooms or even in workshops, as greater freedom is required for the passage of the teacher or student. It is customary to allow not less than 5 ft. to 6 ft. between tables or benches at which students are working back to back, each student requiring about 3 ft. 6 in. of bench length, and there should be ready access to sinks or cupboards to which students may frequently be required to go. Laboratories, like workrooms, are more useable than workshops, as, for example, a chemical laboratory can be used for hygiene, a natural science laboratory for botany, physiology, or biology, while a mechanical laboratory can generally be used for drawing. They are not therefore quite such sources of waste space as workshops. Laboratories are most economical in size when they provide accommodation for twenty, or for whole multiples of that number. It is common in technical colleges to provide a separate smaller laboratory for advanced work in the subjects of physics and chemistry, but however convenient these may be they should not be regarded as essential unless, perhaps, in the case of chemistry, where the extra laboratory is necessary for some special work.

Mechanical Engineering Department.—In Appendix A the laboratory is shown next to the lecture-room. The special object of this is to allow of apparatus being easily moved from one to the other, and to permit of the testing-machine which usually forms a part of the equipment of an engineering laboratory being placed in such a position as to be used for demonstration to large classes seated in the lecture-room. This is not as important with day students, who have plenty of time for experimental work, but with evening students it is a valuable feature, as in lectures to large classes on strength and properties of materials, strength of beams and columns. I have secured this at Battersea by placing the testing-machine as shown in the annexed sketch, where a screen placed around the machine allows it to be used by laboratory students without disturbing the class in the lecture-room, while the removal of the screen and the closing of the doorway between the laboratory and lecture-room permits of the use of the machine in full view of all the students in the lecture-room without disturbing students in the laboratory.



The weight of such a machine for testing up to a maximum load of 10 tons, does not exceed 2½ tons, and does not require special foundations. It may thus be safely placed upon an upper floor when the same is built up of concrete on joists as is usual for workshops. A basement or ground-floor is, however, preferable for an engineering laboratory, as it usually contains a small experimental gas, oil, or steam engine, and other

apparatus which require special foundations and drains. With one large laboratory I would suggest placing all such apparatus in one part of the room, which should have a granilithic floor, due provision being made for drains; the remainder of the floor being boarded. More space is required for the lecturer in an engineering lecture-room than in other science subjects, owing to the larger size of the apparatus used in demonstrations.

The engineering workshop would naturally be placed on the lowest floor, on account of the weight of the machines, and in settling the builder's details of this shop it is very necessary to arrange for the easy and efficient fixing of the overhead shafting. If the shop is chiefly lighted from the top, the vice benches would be best placed along the centre of the shop, and the machines ranged along each side, the operator being between the machine and the wall. In such an arrangement the main driving-shafts would naturally be supported by wall-brackets. If, however, the shop is side-lighted, the vice-benches would occupy the sides and the machines the centre, and the shaft and counter-shafts would require fixing from the ceiling. About 5 ft. of bench length is required for each student, and the machines should not be nearer to the vice-bench than 4 ft. 6 in. or 5 ft., with a like distance between each row of machines. Each forge in the smiths' shop requires a floor-space of about 10 ft. by 8 ft. Smiths' shops are usually regarded as a part of the fitting and machine shop, and seldom contain more than four to six forges.

Drawing-office. — Work in a drawing-office comes under the rule which permits only twenty students to one teacher, but since drawing-classes are usually large in number, it is not advisable to provide accommodation for less than thirty, a better number where the subject is important being forty. Each student requires about 2 ft. 9 in. of table length when using the usual half-imperial boards, and if not quite as convenient, long tables are, at least, as frequently fitted as separate tables. A drawing-office should contain a lecturer's table with plenty of blackboard surface at one end. It must be well lighted, and for this reason is frequently placed on the top floor where a top light can be secured.

Pattern-shop.—If a separate pattern-shop is required, it need not be larger than for fifteen or twenty students, as the numbers for pattern-making classes are invariably small. Its fittings are almost identical with those of an ordinary carpenters' shop, with the addition of one or two turning-lathes.

Building Trades' Department.—It is customary to treat mechanical engineering and building trades as one department, a union naturally suggested by the fact that so many subjects are common to both, and that some of the workshops for building classes (those requiring power) are almost of necessity placed next to the engineering workshops. Then again, it is usually found convenient to group all the workshops together in one part of the building, and when this is done it may not be possible to place the building lecture-rooms and drawing-office near to the workshops. But this separation need not be regarded as inconvenient, owing to the fact that the workshops embracing so many distinct trades are necessarily under the charge of different teachers, whereas in engineering, the whole department is smaller and is more usually under the general supervision of one person, and a wide separation of its different rooms is objectionable. It should be mentioned that in many institutes the classes in practical geometry and building construction are held entirely in the drawing-offices, whereas, at other places, and as at Battersea, the classes meet in lecture-rooms for a descriptive lecture, the actual drawing being done afterwards in the drawing-office or at home. Such different methods of teaching would be fully met by arranging the lecture-room with single or dual desks wide enough to allow of drawing-boards being used, and fixed on the floor-level with the teacher on a well-raised platform at one end. This would serve equally well for a drawing-office or lecture-room, the only objection being that the desks would be of the ordinary table height, and lower than proper drawing tables.

Size of Workshops.—A shop fitted for carpenters' and joiners' work may be used equally well by pattern-makers or cabinet-makers, and we find no difficulty in such an arrangement at Battersea. A bench 6 ft. 6 in. by 2 ft. 8 in. gives ample room for two students, whether junior or senior.

The following table showing entries for workshop classes, together with what has already been said, will serve to give some information with reference to the size and number of shops required.

ENTRIES FOR WORKSHOP CLASSES IN THE FIVE POLYTECHNIC INSTITUTES OF BATTERSEA, BOROUGH-ROAD, NEW CROSS, PEOPLE'S PALACE, AND REGENT-STREET.

	Number of Institutes Holding Classes.	Greatest Number of Entries.	Least Number of Entries.	Average Number of Entries.
Engineering and smiths' work	5	146	35	74
Pattern-making	5	19	9	12
Electrical workshop	2	70	16	43
Electric-wiring and House-fitting	1	28	—	28
Carpenters and joiners	5	148	30	64
Cabinet-making	2	14	6	10
Brick-cutting	4	30	15	20
Masons	1	22	—	22
Painters and house-decorators	1	20	—	20
Plasterers	2	11	5	8
Plumbers	5	142	45	92
Metal-plate work	1	33	—	33

In fixing the position of the shops for painters and plasterers, it should be remembered that they are both subjects (especially the former) to which the application of the principles of form, colour, and design are very desirable. This can be gained by placing them near to the Art Department, not necessarily as a part of it, but in order that the Art Master may pay occasional visits and influence by precept and example the work done. We have adopted this plan at Battersea with considerable success, although it was in part brought about by the absence of suitable rooms near the other workshops. In the case of the shops for masons, plasterers, and painters, there is nothing in the character of the work being done to prevent the theoretical or drawing lesson taking place in the workshop, and I am inclined to think that economy of space would be preserved by arranging tables for drawing at one end of the shop, or in the centre portion, with the work-benches at the other end or around the walls.

It seems desirable to give more room for a plasterers' class, especially if the students are to undertake builders' plastering. It would probably be possible with care to use the plumbers' shop for metal-plate work, but it is not usually recommended. The shops for carpenters, brick-cutting, and plumbing should be on the basement or ground floor, as affording the best facilities for the passage of materials, and the same would apply to the masons' shop, if the work is done full size.

Physics and Electrical Department. — An unfettered choice in the placing of laboratories for physics and electricity would almost certainly result in the choice of the ground floor, on account of the necessity for freedom from vibration. This is more necessary for electrical than for physics work; but in no case is it essential to successful teaching. At Birmingham both laboratories are on the second floor, and this is by no means an exception. The department should be so placed in the building as to be as far as possible removed from the main engine-room, but there is no objection to having an experimental dynamo-room near the electrical laboratory, nor is it essential that the tables in the electrical laboratory should have foundations separate from the laboratory floor. The electrical laboratory and lecture-room should be in direct electrical connexion with the main dynamo-room. A physics laboratory, if for evening students only, need not be large; but with day schools it is necessary that it should be large enough to accommodate at least thirty students. It should contain, or have next to it, a small laboratory for optical work, which can be darkened at will, and should be provided with a supply of hot and cold water and steam, and with at least two sinks. The provision of a photometric gallery (where length is a first consideration) under the gallery of the lecture-room or elsewhere has already been referred to. A well-equipped electrical department should contain an experimental dynamo-room, and should have a firm floor, and one or two workshops for instrument making and electrical house wiring. At the Birmingham school, the whole floor in two wings is taken up with physical and electrical workshops and laboratories, the space thus occupied being 9,900 square feet.

Chemical Department.—This department, or at least the laboratory, should always be on the top floor, the free and efficient ventilation of the laboratory being most important. The preparation-room is most conveniently placed behind the lecture-table, with a large fume-closet in the wall between it and the lecture-room, and if the plan admits of its being between the lecture-room and laboratory, so much the better. Failing this, it should be placed at the side of the lecture-room, and as near the lecture-table as possible. For the purpose of supervision, one large laboratory giving an unobstructed view over the whole of it from any part is preferable to separate laboratories, although chemists generally ask for a separate advanced laboratory. The laboratory should have as part of it, or immediately adjacent, three small rooms, one for sulphuretted hydrogen work, provided with a fume-closet along one side, one as a combustion-room, and the third as a dispensary, where the chemicals not commonly used are stored (top unnecessary). The plan at Battersea admitted of these rooms (each about 8 ft. by 6 ft.) being conveniently formed by screening off an end of one side of the laboratory. In building the laboratory care should be taken to provide passages in the walls and other outlets for the ventilation of the fume closets, to arrange the floor for the drains from the benches (at least a depth of 1 ft. being required to give sufficient fall), and for the outside drains to the ground below. It is, therefore, almost necessary to plan the laboratory before building, especially as the ventilation of the fume-closets require special provisions. Each student requires about 3 ft. 6 in. length of bench, the width of a double bench with students working along each side being 4 ft. 9 in. to 5 ft. There should be one fume-closet to about ten students, when independent of the benches. A balance-room should immediately adjoin the laboratory, or form part of it, fitted with wall-benches, which need not have slate tops. It is usual to provide one balance to about every ten or twelve bench spaces, each balance requiring a bench length of about 4 ft.

Photographic Department.—This department, unless of unusual size, as at the Regent-street Polytechnic, is naturally grouped with the chemistry department, and for this reason its rooms should immediately adjoin the chemistry rooms. Its usual provision is a studio with side and top-lights, which can, if necessary, be used as a lecture-room, and one or two dark rooms, with facilities for the usual fittings. An exposed flat or landing next to the studio is useful for sun-printing. Sufficient attention is not usually given to ventilating the dark rooms, a provision which must be made without admission of natural light.

Natural Science Department.—This department is generally a small one, and requires no special provision beyond a well ventilated and lighted room, which can be fitted as a laboratory, in which one or two sinks are necessary fittings. About the same space is required per student as for physics or chemistry, and a room large enough to accommodate twenty would probably be sufficient for the majority of cases. A lecture-room to accommodate about the same number, adjoining the laboratory, and fitted with a sink in the lecture-table, should be provided if space permits. It would be convenient to place these rooms near to the chemistry or physics department, as in the case of need the lecture-room could then be used for small lecture or exercise classes.

Art Department. — The size and importance of this department, and the subjects it includes, differ very considerably in different institutes. The present day is witnessing a greater extension of the application of art principles to technical industries, and the art departments of our technical institutes are exhibiting less dilettantism, and more of a technical character. Students of metal-work, engineering, and building, especially draughtsmen and designers, house-decorators and plasterers, ought to be found in attendance at art classes, where they may receive instruction in form, colour, and design, directly applicable to the industries in which they are engaged. I have already pointed out the advantage which results from a close connexion between an art department and certain building trade classes.

It is unnecessary to say much on the requirements of an art department beyond pointing out the necessity of a good north light, and the advisability of placing the "lite-room" as an end room, where it may be shut off from general entry. It is usual to provide at least three rooms for paper-work, with separate rooms

for other subjects. Further particulars are given in Appendices A and B, from which it will be noted that a greater space is required for students for advanced work than in science subjects.

Women's Department.—The first necessity in this department is that its rooms should be well grouped together, and shut off from the rest of the building. To have all the rooms on one floor would be most convenient, and there would be no objection to this being an upper floor provided it were approached by a staircase rising from near the main entrance, and not used by men students. In any case the lady superintendent's room and inquiry office should be placed next the entrance door, and the social-room and refreshment-room (if provided) be near the gymnasium. If two floors are utilised, the administrative-rooms, cloak-rooms and lavatory, social-rooms and gymnasium should be on the lower floor, with the class-rooms above. Although, as mentioned later, a separate refreshment-room for women is not found generally necessary for evening work, yet such a room, or one capable of being used as a dining and tea-room is very necessary with day schools. The laundry should consist of two rooms, one for washing and one for ironing, with a good large window in the partition or wall between the two, in order that both rooms may be under the control of a teacher standing in either. To make the laundry and cookery school large enough for fifteen and thirty students respectively would probably be amply large enough for ordinary evening classes, the former subject not being a popular one; but for day-school work it would be advisable to make the laundry also large enough for thirty. The cookery kitchen and ironing-room require a demonstration platform at one end, usually three rows of ten chairs; but for day work it would be a great advantage to have this accommodation in a separate room, or at least so screened off as to be free from disturbance by classes doing practical work. Such a room, if placed between the laundry and cookery school, would probably suffice for both subjects. It need not be more than 20 ft. by 16 ft., with a counter for the teacher, a gas-stove for cookery demonstrations, and a small ironing-stove for laundry (unless sufficiently near the main ironing-room) and a sink. The laundry should be in such a position as to be protected from the outpourings of the main chimney. A drying closet in or near to the laundry would add to its completeness. At least three rooms for needlework for fifteen students each should be provided, two of which would be more convenient if divided by roller shutters. A small fitting room near or next to is found to be very useful, and good accommodation should be made for cupboards.

Music Department.—The chief point to mention here is the necessity for isolation from other rooms where noise would be objectionable. Our experience at Battersea has shown that even double walls and doors are not proof against the passage of the music of a brass instrument lustily blown, or a stentorian bass voice. Where a great hall is provided, I see no reason why a little alteration in the usual accommodation of artistes' rooms should not give all that is necessary for the music classes. A few small rooms for piano teaching, and two or three of large size for orchestral and choral classes being all the usual requirements. The great hall would naturally be used by the choral society, which not infrequently numbers from 100 to 200 or even more. If a hall is not available, then the music-rooms would be best placed at the top of the building, as far as possible from lecture or class-rooms.

Administrative.—The position for the chief administrative rooms, as shown in Appendix A, should need no commendation. The four rooms bracketed should have inner doors from one to the other, and when used as shown, present the best possible arrangement for convenient working. There would be no great objection to placing the council-room on an upper floor. It usually serves a very useful purpose as a reception-room, and would thus be well placed if near the platform entrance to the great hall.

I am inclined to the opinion that a large inquiry-office is unnecessary, and is, indeed, really wasted space. It is too public for use as an ordinary office, and is chiefly used during times of entering students for about two to four weeks in all each term. Ordinary inquiries are best made of the hall-porter, and his small box or office may quite easily contain all the prospectuses and bills which satisfy the usual inquirer. Experience shows that however large an inquiry office may be it is never large enough for the crowds of applicants who throng a large technical institute on the opening nights of a session—and how wasteful to make a permanent provision for a temporary difficulty! At Regent-street they have entered as many as 740 students on one evening, and at most places it will be found that temporary arrangements are made, such, for example, as using the largest gymnasium or great hall for the first week or two of booking.

Recreative and Social.—There should be no hesitation in accepting the position of these rooms, most certainly they should be all on one floor, and that the ground-floor. Students who have a few minutes to spare before, between, or after classes will visit the social or reading-room, or pass from room to room seeking acquaintances, whereas they certainly would not take the trouble necessary to do so if it entailed climbing to different and upper floors. There is also the important question of economy in working. The rooms of this department are open during class vacations, and if they are placed on an upper or more than one floor, it will be necessary to light and heat a greater part of the building than when on the ground floor. I am quite convinced that separation and elevation would be most detrimental to the free and successful use of these rooms. It is difficult to say what the size of this department should be; to visit Regent-street, with its thousands of members, or Battersea, with its hundreds, or Birmingham, where they are entirely absent, would create quite different impressions, and I can only leave the question, with the assistance given by the Appendices, to be settled by the requirements of particular cases.

General.—There are still many requirements mentioned in the Appendices to which no reference has been made, and which I now propose to deal with in general terms. The question of separate entrances, refreshment and social rooms and inquiry offices for women, of the arrangement of entrances, cloak-rooms, and lavatories, are among the details which may make or mar a plan. I am fully aware that the arrangements of many institutes, including polytechnics, are specified in official schemes, to which architects and committees are wont to pay deferential attention. On this point I can only say that, if architects would win Trafalgars, they may sometimes find it necessary to read official schemes as Nelson read the famous signal. Continued experience in the working of these institutes show that many such arrangements are quite unnecessary, and that their provision only adds to the waste spaces of the building and to the expenses of maintenance. Among these arrangements are separate entrances and refreshment-rooms for women. All polytechnics have them; very few use them; and many are finding, as at Battersea, that the sexes can mingle in class-rooms, refreshment-rooms, or reading-rooms with mutual advantage. Separate entrances are useful for special occasions, but for economy in ordinary working the provision of a single entrance, easily controlled by one attendant, is the ideal requirement. The question of cloak-rooms is also important; unless they are near the entrance, the students cannot be prevented from taking their hats and coats to the class-rooms, a proceeding which, in wet weather, is decidedly unpleasant; yet to provide a cloak-room in the most convenient position for such large numbers as 1,000 to 3,000 may not be possible. If cloak-rooms are placed on each floor, or in each department, great expense is incurred in attendants, and these seem to be necessary. Among the eight polytechnics in London I find that the majority have cloak-rooms near mens' and womens' entrances, or on each floor.

At Birmingham the arrangement of departments and the provisions of doors at the entrance to each allow the inside corridors to be used as cloak-rooms, no attendants being necessary—but only a very successful grouping of rooms would make this arrangement workable. My own experience is in favour of large cloak-rooms near the main entrance, and especially is this important with day schools where one large room capable of sub-division and having doors from the outside of the building or playground direct to the rooms are very important. Cloak-rooms would be less sources of trouble than they usually are if fitted with larger windows and glass-panelled doors, so as to be more open to the inspection of the porter on duty at the entrance, or of passers-by. Near the main entrance I would also place a common room for the teaching staff (men and women together) with separate adjoining cloak-rooms and lavatories. Such a room, where all teachers can easily go for the reading of notices, receipt of letters, and for interchange of ideas, does very much to promote co-ordination and good feeling, and to reduce the labour of communicating with the staff. My ideal entrance plan would be one with an outer lobby, a roomy inner hall to which the general public would have access, containing counters for booking students, and in which class time-tables and other notices could be placed. The passage from this hall to the building proper should be such as could be easily controlled by one attendant, whose duty it would be to prevent persons others than students or visitors from entering, and who should be provided with a small box or office at which ordinary inquiries could be made. The building beyond this should open into corridors giving immediate access through separate doors to the cloak-rooms and lavatories for men and women, to the staff common-room, and leading to the different departments. If the women's rooms could be grouped next the entrance so as to allow of their office for booking being upon the opposite side of the entrance-hall to the men's, the plan would be still more convenient and ideal. Some such arrangement of large public entrance hall with inquiry offices, and with small entrance to the building proper, is seen at the Regent-street Polytechnic, while the plan of the Holloway Polytechnic, forgetting its two entrances, presents an arrangement nearer to what I mean than any other institute with which I am acquainted.

I should also like to urge the desirability of placing the engines and boilers in rooms apart from the main building, or at least in such a position that rooms next and above them may be workshops, the classes in which would not be inconvenienced by the noise and heat which machinery must necessarily cause; and, lastly, I would mention how surprised I frequently am to find how few buildings have the corridors between the outer wall and class-rooms, so that the corridor would break the noise from the street, instead of between the inside wall and the class-room, where the room being next the street receives all its noise. At Battersea we have great difficulty in teaching with open windows as is often necessary in the summer months for proper ventilation, on account of the noise from the main road, and it must be much worse with institutes having less frontage than we. Parts of the Yorkshire College at Leeds, and the Birmingham Municipal School, are the only ones known to me where this arrangement of corridor is adopted.

In considering what to include in my paper, I had thoughts of referring more fully to plans of existing institutes, but the usual limits have already been exceeded, and I have had to omit very much of what I hoped to include. It seemed to me that I could do more good by suggesting than describing, and that you would prefer my assuming the character of adviser to that of critic. My chief difficulty has been to know what you expected or desired, and I trust you will excuse me in saying that I was naturally led to the method I have adopted by memories of the kind of questions I am usually asked by architects, and by my desire to supply that information which they are usually wanting, but which is surely so essential to the success of their work as designers of technical institutes. No one can be more mindful than I of the omissions in this paper, but both my time and your proceedings are limited. I can only hope that the information given may be found of service in being generally applicable, and especially if it can help to avoid that perpetuation of blunders, produced by the erection of an institute without knowing the use to which its rooms will be ultimately put, and their requirements. Of the actual fittings of the rooms I have said but little, partly for reasons which will be understood when I say that in this matter I advocate a close partnership between architect and principal, with the latter as predominant partner. The limits of my paper were reached sooner than expected, and I am fully conscious of the imperfect manner in which I have dealt with a great subject. That it deserves this title you will re-acknowledge when I remind you that we spent in this country last year no less than some 800,000*l.* in furtherance of technical education, and that the eight London polytechnic institutes alone were attended by no less than 27,000 students. I commend the question to your careful consideration, for surely it is true that the success of our technical institutes, which you, as architects, can influence, will add to those causes which promote the happiness and progress of mankind.

I desire to express my indebtedness to Messrs. Mountford, Brydon, and Bell, to my friends Dr. Sumpner, of Birmingham, and Dr. Kimmins, of London, and to my polytechnic colleagues for their kind and helpful assistance in lending me plans and diagrams and in supplying me with information.

APPENDIX A.

Notes on position and arrangements of rooms. B=basement floor; G=ground-floor; p=power required; f=strong floors required, free from vibration; F=fireplace required; V=good ventilation necessary.

DEPARTMENT.	ROOMS.	FLOOR.	REMARKS.
Mechanical Engineering.	Lecture-room, Laboratory, p.	B or G.	
	Drawing-office	—	On top floor, for top light (N. light).
	Fitting and machine shop, p., Smith's shop, p., V., Foundry, p., V.	B or G	Usually near to, and in same block as engine-room. One shop sufficient for smiths and foundry. Chimney necessary.
	Pattern shop, p.	B or G	Not necessary with carpenters' shop.
	Teacher's room	—	Next or near to lecture-room.
	Store for tools, &c.	—	,, ,, workshops.
Building Trades (often grouped with Engineering).	Lecture-rooms (2)	—	
	Drawing-office	—	Same as above.
	Carpenters' shop, p.	—	Power advisable for grindstone.
	Brick-cutting ,,	B or G.	
	Plumbers' ,, V.	—	Stoves used.
	Masons' ,,		
	Plasterers' ,,	any	Plasterers and painters, especially latter, should be near Art Department.
	Painters' ,,		
	Teacher's room	—	Not necessary if building trades are grouped with Engineering Department.
	Store for timber and carpenters' work	—	Next or near to carpenters' shop.
Physics and Electrical.	Lecture-room		
	Physics laboratory, f.	—	Capable of division to give small dark-room for optical work.
	Electrical ,, f.	—	Not near engine-room.
	Dynamo-room, p.	B or G.	
	Wiring-shop	—	One shop usually sufficient.
	Instrument-making shop, p.	—	
	Teacher's room	—	Near lecture-room or laboratories.
	Photometric gallery	—	Near laboratories.
	Advanced laboratory	—	Next laboratory.
Chemical.	Lecture-room, Preparation-room		
	Laboratory, V., Balance-room	Top floor	With two or three small rooms.
	Store	,,	
	Teacher's room	—	Near lecture-room or laboratory.
	Teacher's private laboratory	—	Next teacher's room.
	Advanced laboratory	—	Next laboratory.
Photographic (often grouped with Chemistry).	Studio	Top	Also used as lecture-room; top and N. light.
	Dark-rooms, V (2)	,,	
Natural Science.	Lecture-room	—	May conveniently be near Chemistry Department.
	Laboratory	—	
Art.	Elementary room	Top	All art rooms to have top and N. light.
	Advanced ,,	,,	
	Life ,,	,,	With dressing-rooms.
	Modelling ,,	,,	With store-room for clay.
	Woodcarving ,,	,,	
	Metal-working room	,,	
	Teacher's room	,,	Near other rooms; top and N. light.
	Lecture-room	,,	Near other rooms.
Women's Department.	Washing-room, Ironing ,,	B or G	Good light necessary. Chimney wanted.
	Cookery kitchen	First	With store-room and meat-safe. Chimney wanted.
	Needlework rooms (3)	,,	Good light necessary.
	Gymnasium, Dressing-room	G or First	Good ventilation necessary. With wash-basins.
	Social room, f.	First	Near refreshment or reading-room.
	Lady Superintendent's room, f.	G	Near principal entrance to Women's Department.
	Inquiry office	G	
	Mistress's cloak-room	G or First	Ditto.
	,, lavatory	,,	
	Student's cloak-room	G	Ditto.
	,, lavatory	G	
	Demonstration room, cookery	—	Next cookery kitchen.
	Demonstration room, laundry	—	,, ironing room.
	Fitting-room, dressmaking	—	,, needlework rooms.
	Bath-room, gymnasium	—	,, dressing-room.
Music Department.	Choral and orchestral rooms (one large and one small)	—	As isolated as possible from all lecture-rooms, classrooms, or laboratories. Might form part of great hall.
	Pianoforte rooms (3)	—	

APPENDIX A *(continued)*.

DEPARTMENT.	ROOMS.	FLOOR.	REMARKS.
Administrative.	Inquiry office, Secretary's ,, f., Clerk's ,, f., Principal's room, f.	Ground floor at front of building	Next main entrance. With safe. One large room or two small.
	Lavatory	G	Near principal's room.
	Council-room, f.	G	Any convenient position near offices.
Staff.	Teachers' common room, f., Cloak-room (men), Lavatory (men)	G, G, G	Near main entrance.
	Porter's room	G	With store-room and lavatory.
Recreative and social.	Gymnasium (men), Dressing-room (students), Dressing-room (instructor)	G, —, —	Good ventilation necessary. With wash-basins.
	Refreshment-room	G	Next kitchen and near Women's Department.
	Social-room, f., Club-room, f.	Ground floor near to main entrance	Small room for secretaries. Sometimes in one room.
	Reading-room, f., Reference library		
	Bath-room Gymnasium	G	Next dressing-room.
General.	Engine-room, Boiler-room, Coal-store	G	At back of building where noise will not disturb classes.
	Receiving-room	G	Next entrance to which goods come.
	Men's cloak-room, Men's lavatory	G, G	Near main entrance.
	Kitchen	G	Next refreshment-room, with scullery, store, and coal cupboards.
	Servants' lavatory (women)	—	Near kitchen.
	Store cupboards	Each floor	

APPENDIX B.

Size and accommodation of chief rooms at Battersea Polytechnic:—

DEPARTMENT.	ROOM.	SIZE.	ACCOMMODATION.
Mechanical Engineering and Building Trades.	Laboratory	43½ ft. by 25 ft.	Thirty students working at different experiments.
	Drawing-office	45 ft. by 25 ft.	Forty-nine students, seven tables, and lecturer's table.
	Fitting and machine shop	43½ ft. by 25 ft.	Machines for twelve; vice-benches for sixteen.
	Smith's shop and foundry	32 ft. by 25 ft.	Four forges and room for foundry.
	Carpenter's shop	35 ft. by 25 ft.	Benches for twenty-five.
	Brickcutting ,,	32½ ft. by 25 ft.	Bench room for thirty.
	Plumbers' ,,	25 ft. by 22½ ft.	Four stoves, and bench-room for twenty-five.
	Masons' ,,	41 ft. by 8 ft.	Benches for twelve (only temporary).
	Plasterers' ,,	23 ft. by 12 ft.	Benches for ten (crowded).
	Painters' ,,	23 ft. by 21 ft.	Wall space for sixteen or eighteen students.
	Store	13½ ft. by 14½ ft.	
Physics and Electrical.	Electrical Laboratory	33 ft. by 32 ft.	Forty students working at different experiments.
	Physics Laboratory	33 ft. by 22½ ft.	Can be divided into two rooms by rolling shutters. Thirty to thirty-six students.
	Electrical shop	23½ ft. by 25 ft.	52 ft. of bench-length (twenty students). Expl. dynamos occupy 18 ft. by 13 ft.
	Teachers' room	19½ ft. by 14 ft.	
Chemical.	Preparation room	23 ft. by 12 ft.	
	Laboratory	50 ft. by 34 ft.	Forty-nine students. Five fume closets.
	Balance room	17 ft. by 6 ft.	Five balances.
	Teacher's room	17 ft. by 15 ft.	
	Store	12 ft. by 5½ ft.	
Photographic.	Studio	42 ft. by 12½ ft.	Seats for twenty-five and room for studio-work.
	Dark rooms (2)	16 ft. by 13 ft.	Fifteen students each.
Natural Science.	Laboratory	25 ft. by 23 ft.	Wall benches for fourteen, tables for six.
Art.	Elementary room	52½ ft. by 22½ ft.	Freehand seventy, model drawing thirty.
	Advanced ,,	26 ft. by 26 ft.	Fifteen students.
	Life ,,	28½ ft. by 26 ft.	Fifteen students, with easels, or fifty-four for freehand or design, and two rooms about 7 ft. 6 in. square.
	Modelling ,,	22½ ft. by 17½ ft.	Ten to twelve students; clay room, 7 ft. 6 in. square.
	Wood-carving ,,	23 ft. by 17½ ft.	Bench room for twenty-four.
	Teachers ,,	21 ft. by 15 ft.	

APPENDIX B *(continued)*.

DEPARTMENT.	ROOM.	SIZE.	ACCOMMODATION.
Women's Department.	Washing } Laundry	18½ ft. by 25 ft.	Six double sinks against walls; copper and sink; tables for thirty; demonstration platform for thirty; two stoves and screen.
	Ironing } Laundry	32 ft. by 25 ft.	
	Cookery kitchen ...	40 ft. by 22½ ft.	Fourteen at wall tables, sixteen at centre tables, two stoves and sink; platform for thirty.
	Needlework room...	20 ft. by 17 ft.	Tables for twelve.
	,, ,,	32 ft. by 17 ft.	Tables for twenty.
	Gymnasium	60 ft. by 30 ft.	Ample room for thirty-six at mass exercises (clubs).
	Dressing-room	22½ ft. by 12½ ft.	
	Social ,, ...	24 ft. by 22½ ft.	
	Mistress's cloak-room	19 ft. by 15 ft.	
	Students' cloak-room	21 ft. by 19 ft.	
	Dining and tea-room	45 ft. by 22 ft.	
Recreative and Social.	Gymnasium (men)	62 ft. by 40 ft.	Ample room for fifty at mass exercises (clubs).
	Dressing-room (students)	40 ft. by 20 ft.	
	Dressing-room (2) (instructor).....	11 ft. by 10 ft.	
	Refreshment-room	42 ft. by 20 ft.	Ten tables for four each, and counter.
	Social-room	45½ ft. by 22½ ft.	
	Reading-room and library	33 ft. by 32 ft.	Seats at tables for twenty-six, other seats for twenty-four. Seats at tables for twenty-six.

APPENDIX B *(continued)*.

DEPARTMENT.	ROOM.	SIZE.	ACCOMMODATION.
Music.	Choral room	42 ft. by 12½ ft.	Chairs for forty to fifty.
	Piano rooms (4) ...	16 ft. by 12 ft.	
Administrative.	Inquiry office	25½ ft. by 20 ft.	
	Secretary's office ...	22½ ft. by 14 ft.	
	Clerk's ,, (2)	22½ ft. by 15½ ft.	
	Principal's room ...	22½ ft. by 17 ft.	
	Council ,, ...	25½ ft. by 20 ft.	
	Teacher's ,, ...	22½ ft. by 15 ft.	
Lecture and Class-rooms	Lecture-room.....	34 ft. by 42 ft.	Eleven rows of seats 23½ ft. long, lecture table.
	,, ,, ...	34 ft. by 42 ft.	Eleven rows of seats 22 ft. long, lecture table, &c.
	,, ,, ...	33 ft. by 32 ft.	Twenty-four desks for three each, eight rows; lecture table.
	,, ,, ...	40 ft. by 25 ft.	Twenty-seven desks for three each, nine rows; lecture table.
	Class-room	30 ft. by 22½ ft.	Twenty-six dual desks.
	,, ,, ...	24½ ft. by 20 ft.	Four rows of desks 20 ft. long, and forty-eight chairs.
	,, ,, ...	24½ ft. by 20 ft.	Twenty dual desks.
	,, ,, (2)	22½ ft. by 18 ft.	Three rows of desks 17 ft. 8 in. long, and thirty chairs.
General.	Engine-room	40 ft. by 25 ft.	
	Boiler-room	45 ft. by 25 ft.	
	Coal-store	18 ft. by 15 ft.	
	Men's cloak-room...	30½ ft. by 25½ ft.	330 hat and coat-hooks.
	Kitchen	22 ft. by 20 ft.	

Mr. E. W. Mountford proposed a vote of thanks to Mr. Wells for his valuable paper, which would form the nucleus of an admirable treatise on the subject. It was one that architects would be very glad to have, because, as far as he knew, it was the first attempt to put into practical shape the requirements of this important class of buildings. How important the work done in those buildings was might be gathered from what Mr. Wells had said, namely, that 800,000*l.* a year was being spent on technical education, and that, in London alone, 27,000 students attended the various classes at the polytechnics last year. He did not know how the information required could have been given architects in a better form than Mr. Wells had given it. That gentleman had an enormous practical experience of the working of what was one of the largest polytechnics in London, and he knew exactly the difficulties under which the work had to be carried on. Mr. Wells had no doubt learned from experience the shortcomings of his own particular building at Battersea, and had been able to point out how these could be removed in future work. The chief difficulty architects had to contend with, was the fact that the building committees of such places had been entirely in the dark themselves as to what was required, and some of the instructions with which he personally had been furnished at different times had proved eventually to be based on absolutely wrong principles. He supposed it was necessary that architects should learn by experience what were really the essential features of buildings of this kind, and Mr. Wells had referred to several ideas, which, although insisted upon at first, had since been given up. In the matter of entrances, it had been always insisted that the women should have a separate entrance from the men. That, however, had been found to be altogether unnecessary, because there could be no possible advantage in making separate doorways for men and women, who came together and afterwards waited outside for one another. They might, therefore, just as well go in at once at the same door, thus reducing the cost of maintenance in the way of keeping attendants on duty at each entrance. The same remark applied to the various rooms now being established in common. It was considered necessary at first to have separate social and refreshment-rooms, but these had been to a great extent given up, and men and women now met to their mutual advantage in the same rooms. One point to which Mr. Wells did not refer was whether in the case of a practically unlimited site he would prefer a building stretched out to cover a great deal of ground on one or two floors, or one which was more restricted in area, giving the same accommodation on three or four floors. Mr. Wells had mentioned a point on which he considered architects had hitherto been remiss, viz., putting the corridors between the inner wall of the building and the class-rooms, rather than between the outer wall and the class-rooms. For some reasons the outward position would be an advantage, as sheltering the class-rooms from noise, but such a position would be open to considerable difficulties. In the case of planning a building round a quadrangle there would be rooms at the corners, which would be exceedingly difficult to light, and in other respects the arrangement would be somewhat extravagant. Moreover, every polytechnic had not the disadvantage attending that at Battersea, in having a large and noisy thoroughfare alongside it. The information given with regard to the amount of space required for students in the various class-rooms was particularly valuable, because it was a thing that no one without special experience could have supplied. In the case of the class-rooms it was probably easy to calculate the areas, but in workshops it was much more difficult, because the requirements of each particular trade varied to a great extent. For instance, it was obvious that men who had to handle considerable pieces of timber, or men engaged in an iron foundry or smith's shop, would require considerably more room than the men who were doing plasterers' work or even bricklaying. Mr. Wells had not insisted so much as might have been anticipated on the necessity of keeping the cost of maintenance down to the lowest point, though that appeared to be one of the greatest troubles the London polytechnics had to face. It was not so much the cost of the buildings, in the first place, but the cost of their maintenance was a constant source of trouble to the managers. Indeed, he understood from Mr. Wells that at the Battersea Polytechnic the expenditure exceeded 10,000*l.* a year, and he supposed that with larger buildings the amount would go up in proportion. It was, therefore, absolutely necessary that architects should consider how they could keep down the cost of maintenance, not only in the building construction, but in the reduction of the number of attendants required to carry on the work of the building. A very important point had been referred to in the case of the size of lecture-rooms, and it was estimated that the number of students to be lectured to rarely exceeded forty or fifty. In the face of this they constantly found that lecture-rooms holding 200 persons were asked for in buildings where the requirement was absolutely unnecessary. There was, no doubt, great trouble in providing any portion of the building in which music could be taught without interfering with the rest of the students. If they imagined a brass band practising on a quiet summer evening in a room with all the windows open, they could understand that the noise would disturb the whole neighbourhood, let alone the people who were using the building. It did not matter whether the windows were double or treble, if they were open the result was the same. The great hall, however, in such a building came under the control of the County Council, a body whose complete list of requirements was such that any sound made in the great hall would probably not reach the rest of the building. Such a hall, therefore, would be an admirable place in which to carry on the musical instruction.

Dr. Kimmins (Secretary of the London Society for the Extension of University Teaching) seconded the vote of thanks. Mr. Wells had been so delightfully orthodox and had not referred to such controversial matters as the fitting-up of laboratories and lecture-rooms, or he might have had something to say on the subject. He agreed with the necessity of having small as well as large lecture-rooms. In connexion with the Leys School they had a lecture-room holding about 250 people, and a couple holding 30 or 40. They found these small lecture-rooms of the greatest possible use, and if polytechnics were to be used, as undoubtedly they would be very much in the future, for day classes, these small science lecture-rooms would be of great value. There was one point on which he could not agree with Mr. Wells, viz., that it was not altogether necessary to have advanced laboratories for physics and chemistry teaching. He considered them absolutely essential. They might not be quite so necessary in the present day, but in days to come, when more advanced work would undoubtedly be done in the London polytechnics, it would be necessary to have these laboratories. In fact, all those interested in science teaching looked forward to the time when research would be done in those establishments, which would be absolutely impossible without advanced laboratories.

Mr. S. B. Beale remarked that very frequently the instructions given to the architect, as to the accommodation required for the different departments of technical institutions, were somewhat vague, and the arrangements were often left to his discretion. He regretted they had not had a table showing the relative numbers of students attending the various sections at Battersea and other institutions, but Mr. Wells might perhaps tell them the relative numbers attending the elementary and advanced drawing classes, and also what support the modelling class and the class of decorative painting and school of design received. It was important to have some general idea as to how these classes were attended, so that if one were given an area of 5,000 ft., it could be apportioned out with a certain amount of intelligence. One very important feature in a technical institute was the lecture theatre, the planning of which was a very difficult problem to satisfactorily solve. The first matter was the question of area—the proportion of length to breadth—and on this subject there appeared to be a consensus of opinion that something from 30 ft. to 34 ft. wide was not only desirable but absolutely essential, while the height was dependent upon the arrangements for lighting and seating. At Chelsea, the staging of the seats was built right across the windows, and he did not know that from a practical point of view there was any objection to that arrangement, although there might be from an artistic point of view. At Battersea, Mr. Mountford had put all his windows above the seating. The difficulty seemed to be which was the better course to adopt, and he would be prepared to follow Battersea in that respect, and not Chelsea. Another question was how the students were to enter the lecture-theatre, for it seemed inconvenient to have the whole of them entering at a door within a few feet of the lecturer's table, who, if engaged on delicate experiments, would be inconvenienced thereby. This was somewhat got over at Battersea by having a kind of gangway by the side of the

seats, and an upper entrance to the theatre from the rear. There was no doubt that the planning of a lecture-theatre, the arranging of the lighting, and the seating, with the least inconvenience to the lecturer, was a difficult problem to solve. Ventilation was also an important item in regard to technical institutions. At the City Guilds they had a large central shaft which extracted the fumes from the engines, and was originally designed as extracting flue for the whole of the building, but this had not been worked for a good many years. Mr. Wells seemed to think that they ought to have corridors between the class-rooms and the external walls in order that there should be less noise; but Mr. Mountford had happily pointed out that the amount of waste space entailed thereby would be something enormous, and where economy had to be studied such an arrangement was simply impracticable. With the arrangements for ventilation now before the public, it should not be necessary to have to open windows for the purpose of ventilating rooms. At the same time, with a collection of forty or fifty students in a small room, the place soon became stuffy, and the ventilation to be successful must be on some very efficient system indeed.

Mr. Gibson said that separate entrances for the sexes were practically unknown in the north or the Midlands, and in making several designs for polytechnics he had pretty well thrashed this subject out. It seemed, however, to be the recognized thing in the Metropolis that separate entrances should be provided. He hoped that the common sense of the community would be brought to bear upon polytechnic committees, and that they would be able to abolish the separate entrances for the women, and allow both classes to meet in the common rooms, and enter the place together. The designing of corridors next the streets had been sufficiently answered by Mr. Mountford, as far as the difficulty of planning was concerned, and especially where the building had a courtyard, the amount of space lost in the rooms, added to the disadvantage of increasing the length of the corridors, was so great that he did not believe there were half-a-dozen institutions in which such a type of planning would be successful. Even without any system of ventilation whereby air was admitted by power, it was possible, he believed, to deaden largely the outside noise, by using paving in the streets which did not give out the amount of din common to macadam or granite setts. The valuable information they had received that evening could not be over-estimated by them as architects, and he specially referred to the practical advice as to the grouping and designing of departments, so that an architect might know how a polytechnic really was worked. A point had been raised regarding the size of large lecture theatres, which was a matter that ought really to be carefully considered by an architect, when he came to carry his design into execution. It was probably from ignorance on the part of committees that they asked for lecture-theatres that could probably accommodate twice the number of students ever likely to be placed in them, and, as one who had competed a little, he might say that on one occasion when lecture-theatres were asked for to accommodate 200 students, it was mildly suggested that the number ought to be only 100; but the committee stuck to their 200. The lighting of the lecture-theatre should be by means of windows placed very high in the walls, probably about 12 ft. above the floor, or else through the roof, and the theatre ought to be lighted on both sides. The cubic contents of a lecture-room should be kept down to the lowest point consistent with efficiency. The running expenses of the building should be kept in view very largely by the architects when preparing their designs, and it was news to him to learn that it was necessary to have so much supervision in the matter of cloak-rooms in the south, for it was not necessary to the same extent in the north.

The Chairman hoped that Mr. Wells would bring out his address as a treatise. Dealing with what had been said, there appeared to be a consensus of opinion as to the advantages of having a common entrance, but the advisability of external corridors appeared to have been demolished. An outside corridor under certain circumstances might be the best, but on an ordinary London area he failed to see how it was possible to get the required accommodation on the site, and at the same time have external corridors. There were materials advertised nowadays which were stated to prevent sound coming through the walls, and these might usefully be taken up by some enterprising architect. He would like to ask Mr. Wells how the classes at the polytechnic were affected by the attendance of students and peoplewho did not really come under the description of craftsmen or artificers. It would help them if Mr. Wells could give his views as to the educational benefits likely to accrue to architectural students by their attendance at a technical school, and the reflected advantages on those with whom they worked. He would also ask Mr. Wells if he could give them the minimum relative height found to be most useful in a lecture-room.

The vote of thanks was then put and very cordially received.

Mr. Wells, in reply, said that he would recommend a large area with two or three floors, rather than a smaller area with four or more. At the new Municipal Schools of Birmingham they had blocks of seven floors and five floors, but a better control could be had over students with fewer floors. With regard to the disputed question of the position of corridors, he was not in the least surprised at the attitude that had been taken up; but they must not be surprised at his ideas, based, as they were, on the experience he had had of the working of technical institutes. He had only pointed out the practical disadvantages which had arisen in connexion with outside corridors. The size of workshops was an important matter, and in the case of shops where heavy work, like brick-cutting, took place, they could be only used for that particular work, as the work could not be easily removed. His whole paper was an insistance on having the departments carefully grouped together in order to economise in supervision; as for example, they could cut down the expenses at Battersea to the extent of 50*l.* a year by simply closing the women's entrance. Music rooms might be placed over the workshops. Advanced laboratories were not absolutely essential, although very useful if they could be supplied. He marvelled that architects had done so well, considering the very vague instructions they had often received. In Birmingham that was not the case, and there would be found a better grouping of the departments than in any institute he had yet seen. In what he had said about drawing in the workshops, he did not mean that it should go on at the same time as the practical work. In the lecture-room at Chelsea the light came from the right-hand side, whereas it should come from the left. The chief lecture-rooms at Battersea were no doubt too large, but it was not known at first that they would be used for that purpose, and they were difficult to speak in because of their great height. With regard to the ceiling, he preferred a perfectly flat one. At the Leys School the lecturer entered from below and the students from above. In Birmingham the students came in at the top of the lecture-theatre and descended to their seats, while the lecturer came in from the next floor below, and this was the best possible arrangement for working. With regard to the women's entrance, it was the Charity Commissioners who required conversion and not committees. In the cloak-rooms at Battersea it was necessary to have an attendant, who gave a ticket for things left, otherwise there would be continual complaints; and for a day school it was essential that the cloak-rooms should be on the ground floor. They still had separate social rooms for men and women students, and had only a common room for the men and women of the staff. As to the attendance of non-trade students to the workshop classes, he could not say much, because the offer made to architects had not been responded to. Some of his polytechnic colleagues spoke strongly against it, but he could not see how it should act prejudicially. He saw no reason why an architect should not be allowed to work in trade classes connected with subjects relating to his own trade, and he would be prepared to try the experiment. As to the principal being the predominant partner, he meant that he should be so on the question of fittings alone. Surely the man who had taught for years, and who had experience, ought to know better about the necessary fittings in the way of seats, lecture tables, and the like, than the architect. If he could see his way to amplify his paper in the form of a pamphlet, he would be happy to do so, because nothing was worse than to find mistakes perpetuated because architects had not been told what were the necessary requirements.

The proceedings then terminated.

ENLARGEMENT OF THE PARISH CHURCH, BARRY.—The committee appointed to take into consideration the matter of the enlargement of Barry Parish Church have appointed Mr. E. M. Bruce-Vaughan, Cardiff, consulting architect.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

THE NATIONAL BRITISH GALLERY.

THE first Spring Visit of the Architectural Association to works in progress, arranged by Mr. Alfred H. Hart, took place last Saturday, when a large body of members visited the National British Gallery, which is being presented to the nation by Mr. Henry Tate, and which stands on part of the site of old Millbank Prison.

The members were received by Mr. Sidney R. J. Smith, the architect of the building, who explained the general scheme of the building by means of the plans, and conducted the members personally over every part of the building.

Although the plan* has been varied but slightly from the original scheme, the elevations have been very much remodelled. The principal alteration has been the lowering of the central dome. The building itself consists of one principal floor, raised about 12 ft. above the ground, approached from it by a broad flight of steps 40 ft. wide, and resting on a heavily rusticated basement. The centre portion round the dome is carried up for two stories, and is to be used for the display of sculpture. The plans may be roughly described as a central octagon, 38 ft. across, with wings, two galleries deep, extending on each side. These galleries are 32 ft. wide, and vary in length from 60 ft. to 90 ft. At the extremities of the entrance front, an octagonal gallery, 31 ft. 6 in. internally, is to be expressed externally by a dome. The first floor corridors and the room over the vestibule, which is intended as a council-room, are reached by stairs placed in a circular well 23 ft. 6 in. in diameter.

The lighting of the galleries has been considered very carefully by the architect. The wall plates of the galleries, already stated as 32 ft. wide, is 16 ft. above the floor, and from this level starts a steel roof, elliptical internally, and with flat sides externally. Glass is placed along the whole length of the gallery, and starts some distance from the eaves, being also kept down from the ridge.

This position is expected to light the pictures without reflections of any kind. The glazing is on Messrs. Edgcumbe, Rendle & Co.'s "Invincible" system, with copper bars, as used at the National Portrait Gallery. Underneath the ridge, between the inner and outer skin of the roof, are placed the extract shafts of the ventilation system.

The building is fire-resisting, and has been fitted with iron and concrete floors by Messrs. Dennett & Ingle, besides which the central portion, which has two stories in height, has brick arches and flat saucer domes under the first floor. The building is being faced throughout with selected brown Portland stone. Messrs. Higgs and Hill are the general contractors, and Mr. C. Smith is executing the stone carving.

At the invitation of Mr. Sydney Smith the members took tea, and dispersed after a very instructive visit.

* See *Builder*, March 19, 1892.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The fifth meeting of the session was held on the 5th inst. at the rooms in Sackville-street, Piccadilly, the Rev. Cave-Browne in the chair. Mons. Th. Kounderewitch, of Kiew, sent for exhibition a photograph of a religious picture, which was described as enamelled on a copper plaque plated with silver, the subject being the last moments of our Saviour. The sky above the cross was represented to be of gold, hills of green enamel; stars and silver rays formed the background. The flesh of the body of our Lord was of a bluish tint. The size of the picture is about 9 in. by 5½ in., and from the type of art, together with the costume of the figure kneeling at the foot of the cross, probably the donor of the picture, it was considered to be of Spanish design of the sixteenth century. Mr. Earle Way brought for exhibition a specimen of pottery which, although of quite modern date, was particularly interesting owing to its being a survival of a method of manufacture as old as the days of the Britons. This pottery was not turned on the wheel, but was entirely hand-made, glazed with milk being poured over it and sun-dried. It is called Barbas pottery, and is made at Barbas, about nine miles from Stornoway. A paper by Mr. Syer Cuming, F.S.A.Scot., was read by Mr. Patrick, Hon. Sec., upon the Dolium and Doliolum, which was nicely illustrated by pen-and-ink sketches by the

author. The author showed that the tub in which Diogenes lived, according to the popular saying, was a huge earthern vessel, called by the Greeks Pithos and by the Romans Dolium. These Dolia were of vast size, sometimes over 6 ft. in height, and were used for purposes of storage, both dry articles and fluids. Even wine was kept in them, until it was in fit condition for bottling off into amphoræ. They were extensively used on the Continent, but scarcely any trace of their employment in this country is to be met with. The Doliolum, however, which was of similar character but of much smaller size, averaging about 9 in. in height, was in constant use in England by the Romans for domestic purposes of all kinds, and many examples are to be seen in the various collections of Roman pottery. Many of these Doliola had opercula, or lids, of earthenware, and are described and illustrated in the "Journal" of the Association.

Illustrations.

ST. MICHAEL AND ALL ANGELS, COLEHILL.

ABOUT a mile and a half from Wimborne Minster, upon a hill covered with wild fir-wood, St. Michael's Church is beautifully situated. The surroundings suggested the treatment of the architecture. The chancel is of brick, and the nave has a brick base, with timber construction over. All the windows are of oak. The arcade is entirely constructed of wood, and the whole nave interior is very simple in general character, with a beam-like roof; but the interest is intended to centre in a delicately-wrought and fretted rood-cross, set in expanded traceried wings.

An effort has been made to show that Late Gothic and Renaissance detail may be brought into harmony in the nineteenth as in the sixteenth century, but without using "debased" forms of either. The altar and font mark the most divergent extremes.

The pulpit and altar were executed and presented by the Rev. Canon Gildea, of Blominster. The builders were Messrs. Cornish & Gaymer, of North Walsham.

The church is a tribute to the energy and devotion of the late Colonel Leopold Paget, of Park Homer, who, after many years of labour in its behalf, died soon after the foundation-stone was laid.

The architect is Mr. W. D. Caröe, and the sheet of drawings was exhibited at the Royal Academy of last year.

MESSRS. ERARD'S PREMISES, No. 18, GREAT MARLBOROUGH-STREET.

MESSRS. ERARD'S premises were rebuilt in 1893-94 at a cost of 9,104*l.*, the contractors for the work being Messrs. Patman and Fotheringham. The whole front is composed of terra-cotta from Messrs. Edwards' works at Ruabon; the bricks being specially picked to keep the scheme of a golden colour. Of the bronze reliefs, the "Orpheus" is by M. Edouard Lantéri; the side panels of the tympanum, "The Beasts" by Mr. T. Nicholls; and the "Composers" medallions by Miss Canton. The interior marble work, columns, &c., were supplied by Messrs. Goad, of Plymouth, the shafts being monoliths, and remarkably fine specimens of Devonshire marble. The heating was carried out by Mr. Moore, of Great Pulteney-street, and the stained and leaded glass by Mr. James.

The plan of the building—so far as the rebuilt part is concerned—is a simple one, comprising, on the ground floor, an entrance hall with waiting-room and manager's offices, piano saloon, and staircase leading to the larger showroom above, which extends the whole width of the Marlborough-street front.

The second floor comprises practising-rooms and servants' offices, and the basement is devoted to second-class showrooms, clerks' offices, stores, &c.

The ground floor is panelled with deal painted white, and the first floor with oak. The floors throughout are laid with teak and oak by Messrs. Goddard, of Farnham.

The terra-cotta reliefs were modelled by Mr. Nicholls, as was also the harp on the centre pediment, which is an exact model of an ancient example in the South Kensington Museum. Messrs. Fawcett's fireproof system is used throughout the building.

PERCY G. STONE.

ROMANESQUE ARCHITECTURE.

THIS sheet of illustrations includes some of the diagrams accompanying Professor Aitchison's second Royal Academy lecture, delivered on Monday last; including the plan of Sta. Maria in Cosmedin, that of St. Lanfranc Pavia, the plan and section of St. Ambrogio Milan, the section of San Michele at Pavia, and a few of one of earliest existing pieces of Romanesque architecture, the so-called Palace of Theodoric at Ravenna, which now forms part of the front of a Franciscan convent.

The Lecture of which these are illustrations will be found reported in full on page 132.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring-gardens, Sir Arthur Arnold, Chairman, presiding.

The New Clerk to the Council.—After a long debate, Mr. J. C. Stewart, Official Receiver in Companies' Liquidation, was elected Clerk to the Council, in place of Mr. de la Hooke, who will shortly retire.

The Cost of Expert Evidence.—A Special Report of the Finance Committee was brought up with regard to the fee of seventy-five guineas charged by Professor Corfield, Medical Officer of Health of St. George, Hanover-square, for giving evidence at the recent Local Government Board inquiry into water companies' regulations. The Special Report of the Committee was as follows:—

"The inquiry, though apparently involving a very simple question, was one upon which the Council encountered a most determined opposition from the combined water companies. The Council's case lasted two and a half days, the water companies' lasted three and a half days, and speeches occupied another day. The companies' counsel cross-examined the Council's witnesses at great length, and called a large number of expert witnesses of high standing. In order properly to support the Council's case, it was necessary therefore that the Council should have witnesses of equal eminence. Dr. Corfield was not engaged in his capacity of Medical Officer of Health of St. George, Hanover-square. He carries on a large independent practice, and is widely consulted with reference to sanitary matters; and it was as an expert of eminence, quite independent of his position as Medical Officer of Health, that his services were retained. The fees charged are on the same scale as he is in the habit of charging, and the Council itself has paid him in respect of the London Water Bills of last Session, except that in the case of those Bills he charged also a retaining fee, whereas he has not charged any retaining fee in the present case. We understand that there is a probability of the Parliamentary Committee wishing to retain Dr. Corfield's services in relation to the water question during the present Session, and that they would be prepared to do so on the same terms as last Session."

Mr. C. H. Campbell moved and Mr. Wetenhall seconded—"That the estimate of 650*l.* for expenses of counsel and witnesses connected with the inquiry by the Local Government Board as to the suggested amendment of the water companies' regulations under the Metropolis Water Act, 1871, be referred back to the Committee, and that Dr. Corfield be informed that under all the circumstances of the case the Council cannot agree to give more than 40*l.* for his services on the occasion in question."

After some discussion, during which Mr. Bruce said that Dr. Corfield had only charged the fees which were previously arranged with the solicitor, the amendment was defeated, and the report of the Committee was agreed to.

Sewer Gaugings.—It was decided, on the recommendation of the Main Drainage Committee, to expend a sum of 700*l.* in providing, and fixing in the sewers at certain points, seven automatic gauging machines.

Weights and Measures Office, &c.—The report of the Public Control Committee contained the following paragraph, the recommendations being agreed to:—

"The Works Committee has reported that it is not satisfied with the estimate for the construction of the proposed western weights and measures office, Harrow-road, referred by the Council on October 22 last, or with the estimate for the construction of the proposed Rosebery-avenue gas-meter testing-station, referred on November 26. The architect states that having carefully considered the figures, he is satisfied that the estimates are sufficient. We therefore recommend—

(*a*) 'That advertisements be issued inviting tenders for the construction of the proposed weights and measures office in the Harrow-road, and that it be referred to the solicitor to prepare the necessary form of contract.

(*b*) That advertisements be issued inviting tenders for the construction of the proposed gas-meter testing station at Rosebery Avenue, and that it be referred to the solicitor to prepare the necessary form of contract.'"

Proposed General Hospital for South London.—It was agreed, after some discussion, and on the recommendation of the Corporate Property Committee, that, subject to an agreement to be prepared by the solicitor, the Council do let lots 14 to 26, Coldharbour-lane to the authorities of the proposed general hospital for South London, at a ground-rent of 170*l.* per annum.

Widening of Bridge over Pancras-road.—The Highways Committee reported as follows:—

"We have considered two plans submitted on behalf of the Midland Railway Company, under its Act of 1890, for the widening the bridge carrying the railway over Pancras-road. The plans show the bridge to be of a span of 60 ft. as required by the Act, and, as suggested in accordance with the resolution of the Council of December 3 last, a brick fence wall is provided for to prevent the public passing into the recess which will be formed between the west abutment and the boundary of the company's proposed new buildings if placed up to the extent of the forecourts. We understand, however, that the Improvements Committee is in communication with the company with a view to the road being widened to 60 ft. at this point, and in that case the fence wall will be removed. The proposals for deadening the sound of passing trains, and for the drainage of the bridge, appear to us satisfactory. We recommend—

'That the Council do approve the plans submitted on behalf of the Midland Railway Company, under its Act of 1890, for the widening of the bridge carrying the railway over Pancras-road.'"

The recommendation was agreed to, and the Council soon after adjourned.

COMPETITIONS.

ROYAL INSURANCE BUILDINGS, LIVERPOOL.—The Royal Insurance Company of Liverpool, having decided to add a block of buildings to their offices, which front Dale-street and North John-street, recently invited plans from four Liverpool and three London architects, and the result of the competition has just been made known. The first premium has been gained by Mr. J. Francis Doyle, of 4, Harrington-street, Liverpool; the second premium was awarded to Mr. E. W. Mountford, of Buckingham-street, Strand, London; and the third to Messrs. Woolfall & Eccles, of Liverpool. Among the other competitors were Mr. John Belcher, London, and Mr. T. E. Collcutt, London. Mr. Norman Shaw was the assessor.

WELSHPOOL COUNTY INTERMEDIATE SCHOOLS.—The assessors in this competition, Messrs. Woodhouse and Willoughby, of Manchester, have placed first, Mr. Frank H. Shayler, of Welshpool and Oswestry (who will receive the premium of twenty guineas); second, Mr. H. Teather, 65, Alexandra-road, Cardiff; third, Mr. Charles Heathcote, 6, Princess-street, Manchester. There were twenty-five competitors.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—At the last ordinary monthly meeting of this society, the President, Mr. C. Hadfield, F.R.I.B.A., in the chair, Mr. Thomas Winder delivered a lecture on "Local Half-timbered Buildings," in which he said that the early builders were in the habit of building with materials indigenous to the locality in which they built. Illustrations from the chalk and slate districts were shown in proof of this. Hallamshire was originally one vast forest, and it was natural that timber should be the favourite local building material. The disappearance of our forests was due to the large amount of wood made into charcoal, for melting iron ore; and even when coal came to be used for this purpose, large quantities of timber were used for shipbuilding during the wars of the last century. During the last three years valuable unrecorded examples of early timber work had disappeared from Sheffield. Mr. Winder traced the use of timber in early military works, and remarked that these were the schools in which the early inhabitants of Hallamshire learnt the art of building in timber. The circular conical hut of the "charcoal burner," or "ground collier," was probably the earliest type of house. He was uncertain if framed houses were descendants of the "ground collier's" hut, or sprang from another origin. In proof of the great age of this type of house in the British Isles, he showed drawings of Irish "crannoys" dug up in Irish bogs, from under fifteen to twenty feet of peat. Numerous examples of local framed work were shown, including the Ponds Laundry, Broom

Hall, Carbrook Hall, Brightside Hall, &c. The construction of this class of work was described, and illustrated by drawings. A photograph was shown of the last surviving door of Sheffield Castle. Drawings made by Mr. C. M. E. Hadfield were shown of the Bishop's House, Meersbrook Park, and also a copyright photograph by Mr. John Harrop of the old half-timbered building recently removed from the end of Change-alley. The lecturer also acknowledged his indebtedness to Mr. E. Claude Skill for the preparation of the numerous slides with which the lecture had been illustrated. It was announced that the next lecture will be by Mr. Hugh Stannus, F.R.I.B.A., of London, on "Axiality," and that the prize drawings of the Royal Institute of British Architects will be exhibited in Sheffield on March 17.

LIVERPOOL ARCHITECTURAL SOCIETY.—On the 10th inst. the fifth ordinary meeting of the session of the Liverpool Architectural Society was held in the Law Library, Union-court. The meeting was presided over by Mr. Alfred Culshaw, the Chairman. During the evening, Mr. H. Longden read a paper on "Some Works of the Late Mr. Sedding." The subject treated was ecclesiastical decorative work, and the address was profusely illustrated by means of the lantern, which depicted some tracery in wrought iron, carving, altar-cloths, &c. At the end of the lecture Mr. Longden received a cordial vote of thanks.

CARDIFF, SOUTH WALES, AND MONMOUTHSHIRE ARCHITECTURAL SOCIETY.—The annual general meeting of this Society was held on the 5th inst. at the Society's rooms, Church-street, Cardiff, the President (Mr. Bruce Vaughan, F.R.I.B.A.) in the chair. The annual accounts were passed, showing a considerable balance in hand, a portion of which it was decided to expend upon the Society's library. The President thought that the Society would do right in continuing to occupy the rooms in Church-street, as they seemed to be regularly used by the assistants and pupils for study, &c.; he also informed them that a class for modelling in clay, or wax, and wood-carving had been formed for the benefit of the younger members of the Society, and that he had obtained the services of Mr. Taylor as instructor. This class also was well attended. A committee, consisting of the President and Messrs. Bruton, Fowler, Carter, Phillips, and Wilson, was then appointed to arrange a programme of prize competitions and sketching classes for assistants and pupils. In the election of officers for the ensuing year, it was unanimously decided that in order to show their confidence in the way in which Mr. Vaughan had performed his duties as President, the members would be justified in departing from their usual course and re-electing Mr. Vaughan as President of the Society for the ensuing year. The remaining officers were then elected as fellows:—Mr. Carter was re-elected Hon. Sec. and Treasurer, Mr. J. H. Phillips was elected joint Hon. Sec. with Mr. Carter, Mr. Capel, Hon. Auditor, Mr. C. Wilson, Associate's Hon. Sec., and Mr. Hiley, Hon. Librarian. It was decided to hold the annual dinner on April 8.

ARCHITECTURAL CLASSES, GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—The first class visit this spring was paid on Saturday afternoon last week to Ruchill Hospital. The attendance was so large that the students separated into two parties, one being conducted by Mr. James Lochhead, A.R.I.B.A., and the other by Mr. Hannah, the clerk of the works. At the close, on the motion of Professor Gourlay, a very hearty vote of thanks was accorded to Mr. A. B. M'Donald, the City Engineer, for his kind permission to visit the hospital, and to the conductors of the two parties.

Books.

In Search of Gravestones, Old and Curious. By W. T. VINCENT. London: Mitchell & Hughes. 1896.

THE author, who is President of the Woolwich Antiquarian Society, has been struck by the curiously *naive* fancies carved on many of the ordinary tombs in country churches, of the last or early part of the present century. He has set about hunting for and sketching examples of them, and in this book has given us illustrations and descriptions of about a hundred. The drawings are not remarkably good, but they may be said to be good enough to illustrate the subjects, which are in almost every instance quaint and curious rather than artistic. What the author has specially sought for are allegorical carvings. Some of these are grim and ugly, skulls and cross-bones forming the prominent features; others are rather pathetic in the evidently sincere intention of the carver to illustrate the Christian faith. Certain favourite forms seem to recur in special neighbourhoods, as might be expected. One of which there are several examples, differing in detail but the same in idea, illustrates evidently the sentence "O Death, where is thy Sting," by the figure of a winged angel of the Resurrection taking the dart out of the hand of Death, represented by a skeleton, who in most cases falls prostrate, but in one instance is dramatically struggling with both hands to retain his weapon. The allegory is further carried out by an opening tomb or coffin and a joyful figure emerging from. Death cutting down a tree with a scythe is another design. Some of them are more homely and less sublime in intention; one headstone, evidently to a carpenter, shows all his tools realistically carved in bas-relief.

The author believes he is the first who has undertaken any systematic illustration of this class of rustic funeral allegory on headstones. It was quite worth doing, and we hope he and others will continue to preserve these curious relics in illustrations. The originals will in process of time be obliterated, and they are very interesting examples of the taste and feeling of past generations, and of a humble class of art exercised by forgotten hands in out-of-the-way corners of England.

Transactions of the Monumental Brass Society. Vol II., Part 6: and Portfolio Parts 1-4. Cambridge. 1895.

THE "Transactions" contains a continuation of the alphabetically arranged notes on the brasses of Bedfordshire; those of Cambridgeshire have already been dealt with in the same manner, and a similar series of Huntingdonshire is promised. The four numbers of the "Portfolio" each contain about half-a-dozen large-scale lithographs from rubbings of brasses, some of considerable importance and interest. Brasses are of course a special passion with some persons, and their archæological importance as records of past personal and family history can hardly be overrated, while they afford also valuable records as to costume, and occasionally fine examples of decorative treatment. It must be admitted, however, that there is an amount of repetition of the same pose and general design, both in figures and accessories, at all events in the same neighbourhoods, which renders it possible for those who are not specialists to tire of them. Fortunately, however, every branch of archæology finds its own devoted adherents, who do good work in keeping up a special study which might otherwise be dropped.

A Handbook for Surveyors. By MANSFIELD MERRIMAN and JOHN J. BROOKS. New York: Wiley & Sons. 1895.

THE authors are respectively Professor and Instructor in Engineering in Lehigh University, and the book is intended to supply a small treatise on surveying in pocket-book form, together with various tables. Such a book is of course of chief value to students engaged in learning field work, who may find it very advantageous to have a short statement of the theory of what they are doing in their pockets, for reference on the ground. Being written by American engineers, there are some minor differences from English practice in method and phraseology, but these are not important. We observe that the Y level is spoken of as the normal form, and the Dumpy as an exceptional variation, the superiority of which in almost every point is however admitted; so that it is to be concluded that American engineers still habitually use the Y level. The operations of surveying are very clearly illustrated by maps of imaginary surveys, and the methods of using instruments and recording on the field-book are explained. There are no illustrations of the instruments used, as the book is intended for students engaged in practical work, and those likely to use it will necessarily have the instruments before their eyes. The book is admirably done, and supplies a want.

Economical Houses. By HENRY GOLDSMITH, Architect. London and Manchester: G. Falkner & Sons.

THIS is one of the most amusing books we have seen for some time. It professes to show how anyone can be provided with artistic and comfortable houses at an expenditure far below that which is generally considered necessary. The author specially draws attention to the necessity for considering aspect and sunlight, and of doing away with useless passages. As to the latter, the plans, which seem to be put together on no principle whatever, are full of long and unnecessary passages (see the first-floor plan on Plate 2 for instance); as to the former, he gives no north point to any of his plans, but we presume, from internal evidence, that they are all orientated the same way and that the upper side is the north, though the author omits to mention this. Taking it thus, we observe that in the plan attached to Plate 9 the room called "morning-room" has only one window facing directly to the west, so that if it were used as its name implies, there would never be any sun in it during the time of its occupation. On the same plan the bedroom over the drawing-room is so contrived that there could be no place for the bed except close against the window, close against the fireplace, or immediately facing the door. This ingenious arrangement is repeated in many of the other plans. In the basement plan of No. 8 the wine-cellar is placed opening out of the "wash cellar" and next to and separated by an apparently 4½-in. wall from a water-closet, which also opens direct out of the "wash cellar"; in another a water-closet opens direct out of the back kitchen. The architectural style of most of the exteriors is beneath criticism, and we should not have paid the book the compliment of a notice at all, but that it is necessary to warn the public against being taken in by productions of this kind.

Stott's Architects' and Surveyors' Handbook of Gasfitting: Tables and Tests. By A. H. CRUMP. London: James Stott & Co.

THIS small manual is issued by a firm of gas-lighting engineers, and may be presumed therefore to be reliable in its statements of the main points to be observed in regard to the installation of gas-lights; though there is also an opportunity taken of recommending some of the publisher's own patents. Still the small book is not merely an advertisement like some productions of this kind. The table of observed illuminating efficiency of gas-light in reference to size of burner and weight of pressure is really valuable, and the general directions in the book will be useful to those who wish to see that a building has been properly treated in regard to its gasfitting. A form of quantities for gasfitting is included, as well as a form of specification for gasfitting work.

TRADE CATALOGUES, &c.

THE managers of the "Glashüttenwerke Adlerhütten" send us the catalogue and description of Falconnier's patent blown glass bricks, which are blown on the same principle as ordinary bottles, but in different shapes suited to the purposes for which they are to be used. It is stated that as these bricks are closed while still hot, they are absolutely translucent, with no foreign particles in them; and we have no doubt that what is stated as to their superior retention of heat when used for hothouses, as compared with ordinary glass, is quite true. The fact, however, that they expand somewhat under a rise of temperature would render their use troublesome in work on a large scale. It is directed that each brick should, for large works, be painted with a special glue, which is chemically destroyed by the cement, and leaves room for the brick to expand; but this means much cost in setting, and want of binding in the cement. Their chief use will be for small works.——Messrs. Baird Thompson's new catalogue contains a large number of specimens of ventilators, many of them of what they call the "Grah-tryx" type; all these will no doubt be most efficient to prevent down-draught, but they will not create up-draught or exhaust in still weather. However, those who want certain means of ventilation can find it under another heading in the catalogue, where various forms of mechanical fan are illustrated. The catalogue also describes and illustrates various forms of electric motor, ventilating fireplaces and radiators, gas-engines, air-compressing engines, pavement and floor lights, earth-closets, drain-testing machines, filters, &c.——The "General Electric Company" issue a remarkable catalogue of nearly 1,000 pages, which really forms a kind of illustrated epitome of the various applications of electricity in the present day, and appears to include illustrations of every kind of instrument and utensil in which electricity is applied, even down to electrical surgical instruments. The catalogue will be a very useful one for architects, from its immense number of illustrations of electric plant of all kinds, and the amount of practical information to be obtained from the

notes and descriptions.——The "Lion Foundry Company" send us a large catalogue of baths, lavatory fittings, pipes and connexions, gutter sections, &c. The baths and lavatories seem to be of excellent make, material, and construction, the only drawback to them being the amount of "ornament" inserted; this may sell them better, no doubt, with the general public, but we speak for architects, and we can assure the company that architects would far prefer the plain baths shown in the catalogue to those which are supposed to be decorated. In the lavatories there is not even a choice of a plain casting given; they are all "ornamental," and the ornament is such as is quite unsuited to cast iron. Manufacturers who wish to recommend works in cast iron to the architectural profession should get designs of a simpler kind made by an artist who understands what can be properly attempted in cast iron decorative work, as we have many times before pointed out in similar cases; they would find some expenditure in this way would fully repay itself in the long run.*——Messrs. Hamilton & Co. send us a catalogue of painting brushes, with many illustrations of their various forms of brushes for different uses.——Messrs. Shand, Mason, & Co., send us their "occasional circular" of various appliances forming, with photographs, "a record of progress in fire-extinguishing apparatus."——Messrs. Jones & Campbell send us a catalogue of grates and chimney-pieces, including various forms of their "Belle" cooking-range, specially designed for economic heating and easy access to the boiler for cleaning purposes.——The "Universal Directory of Railway Officials," issued by the "Directory Publishing Company," contains a list of railway officials all over the world, grouped under companies, and alphabetically.

* We may point out that this criticism on the ornamental work in trade catalogues, which we have often had to make, is not intended in an unfriendly spirit, but is really the best advice we can offer. These catalogues, it must be remembered, are to a great extent intended for architects—we know that they are sent round to architects in large numbers. We are endeavouring to explain to those who issue them what architects would really like, and therefore to enable them the better to recommend their goods to the profession.

Correspondence.

To the Editor of THE BUILDER.

CORNBURY PARK, OXON.

SIR,—Adverting to your "Note" (p. 88 *ante*) on Cornbury Park, I find the following entries in the Stone MSS., which were bought at the sale of Vertue's effects by James Paine, senior, architect to George III. and the then Board of Works. They are bound with diaries, sketches, &c., in four parcels, and it seems were ultimately bought by Soane, whose book-plate is in the small account-book bound in red calf. They are annotated by Stone's sons, his nephew Charles Stoakes, Vertue, and others.

1631. Agreed for 3 stone gates for the Phisick Garden at Oxford, and to survey and direct the building of Cornbury House, 1000*l.*

In 1631. Agreed with the Honbl. Lord Earell of Danby for to mak 3 ston gattes in to the Phiseck Garden, Oxford, and to desine a new hows for him at Corenbury in Oxfordsheer, and to de Ruckt the workmen and mak all thar. I was thar in 2 years 33 times and my covenant of acord with his lordp was 1000*l.*

1631. [Sundry payments to workmen at Cornbury House.]

The above are in Nicholas Stone, senior's, writing. In Stoakes's list of his uncle's "most Eminentt Workes" is written:—

The Curious Phisicke Garden hee desined & made the entrances of stone Att Oxford Now to be seene. . . . In ye same yeare hee desined Cornbury House in Oxfordshere hee wnt 33 journeyes for which lord Cornbury gave him a 1000*l.* well paide.

The "Lord Cornbury" I take to be the Earl of Danby, *obiit* 1644, for Lord Hyde was advanced Viscount Cornbury and Earl of Clarendon some years after Stone, senior, died in 1647.

Timothy Strong built, 1631, the south front, with great hall, of Cornbury; his son Thomas built, 1663-5, for Lord Clarendon, the stables, terraces, and some other portions, under Hugh May's directions; *vide* the "Dictionary of Architecture."

W. E. D.-M.

BOILER EXPLOSIONS.

SIR,—In this week's issue we notice, on page 107, an article with reference to the explosion of domestic and other boilers, wherein the Manchester Steam Users' Association have come to the conclusion that for high-pressure heating apparatus, as a safety-valve is inadmissible, that there is no other way of preventing explosion except by keeping on the fires. And we would point out that some years ago we introduced a fusible diaphragm which we attached to our apparatus, and which meets the objection, and shall be pleased to explain its action to anyone interested; all we can say is that, from a number of years' experience, it has been found to fully answer its purpose. RENTON GIBBS & Co.

Liverpool, February 12.

"MADE IN LONDON."

SIR,—Now that articles from abroad are marked with the name of the country of their manufacture, the result is so satisfactory that I should like to see the system extended to designs sent in for architectural competitions.

In place of the country I would that the authors had to attach the name of the town in which the design was concocted.

The above was suggested by a recent limited competition in the western counties, in which four local and two London men were invited; four of the six sets of designs should have been labelled "Made in London." "AN OBSERVER."

The Student's Column.

CARPENTRY AND JOINERY.—VI.

ROOFS.—II.

THE king-post roof-truss may be used up to spans of 30 ft., but as it has been found that the points supporting the tie-beam should not be more than 14 ft. to 16 ft. apart additional vertical ties known as *queen-posts* are introduced, and the roof shown in fig. 63 is the result, where it will be seen that the tie-beam is supported in two places, and the length of the common rafters is also supported by means of two purlins, one resting on the back of the principal rafter and the other on the straining-beam. In this construction a straining-beam supported by cleats is introduced between the heads of the queen-posts, to hold them in position, the tendency being for the principal rafters to press their heads towards each other. On the tie-beam is placed a straining-cill to keep their feet in position, in addition to the stub-tenon with which they are connected to the tie-beam. The queen-post roof-truss is used for spans from 30 ft. to 46 ft. The gib and cottar-joint is used to the feet of the queen-post for the same purpose as in the king-post truss described in the last article. It will be seen that the queen-posts carry approximately two-thirds the weight of the tie-beam and ceiling (if any). In roofs over 46 ft. and up to 60 ft. span, the tie-beam requires to be upheld in more than two places, and additional posts known as *princesses* are introduced as suspending pieces (fig. 64). The straining-beams in spans over 50 ft. require supporting in the middle of their length, and this is effected as shown, by means of a small king-post let down from the principal rafter continued to the ridge, or by means of struts from the queen-posts. Roofs, however, of this large span are usually in these days constructed in iron or steel, and little good can come from discussing their construction in wood, although Tredgold gives numerous examples.

We give below the scantlings adopted for queen-post roofs, with or without ceilings, by the Royal Engineers in the War Department buildings, as they are considerably more economical than those recommended by Tredgold. Horizontal wind force allowed is 45 lbs. per foot, acting only on one side of a roof at a time, or a normal pressure of 30 lbs. per foot for a 30 deg., and 40 lbs. for a 45 deg. pitch. The scantlings are for pitches up to 30 deg. Timber, northern pine; countess slates on 1 in. boards. For roofs of of 45 deg. pitch, add 1 in. to the depth of common rafters, purlins and struts, and ½ in. to the depth of the principal rafters as given in table.

Details of Roofs.—We have now discussed roofs which have terminated in gables, and in which ordinary principles can be used, but cases often arise in which two roofs cut into one another at right angles, or terminate in what is known as a *hip* (figs. 65, 66). In such cases *hip-rafters* (*h* figs. 65, 66) and *valley-rafters* of deep and narrow section are brought into use, and the jack-rafters are spiked to these. The tendency of the hipped-rafter to thrust the wall outwards at angles is counteracted by what is known as a *dragon-beam* (D figs. 67, 68). In this construction the hip-rafter at its base is tenoned into a mortise in the dragon-beam, which is notched on to the wall-plate and supported on its inner edge by being tusk-tenoned into an angle-brace A, which is secured to the wall plates. In roofs where king and queen-post trusses are employed, and where a hipped-roof is constructed, half-trusses are used at right angles to the main truss to which they are secured.

The question of trimming voids for chimneys, &c., is considered in a later article.

Eaves of roofs, &c.—There are still some points in connexion with roofs which we must briefly consider, as overhanging eaves, dormer windows, and gutters between adjoining roofs and behind parapets. The eaves are the lower portion of the rafters of a roof which overhang the wall and help to protect it from the rain. To the ends of these rafters is fixed an iron gutter to collect the rain-water, which is taken by pipes to the drains. Fig. 69 shows a method of fixing a moulded cast-iron gutter to the feet of the rafters, and fig. 70 a method of securing a half-round gutter by wrought hanging irons. Dormer windows are worked vertically in the side or inclined plane of the roof, and are formed by means of valley-rafters in which the jack-rafters are framed. Dormers are largely used for the lighting of rooms in the roof, and in Mediæval structures have, of course, been very elaborately treated.

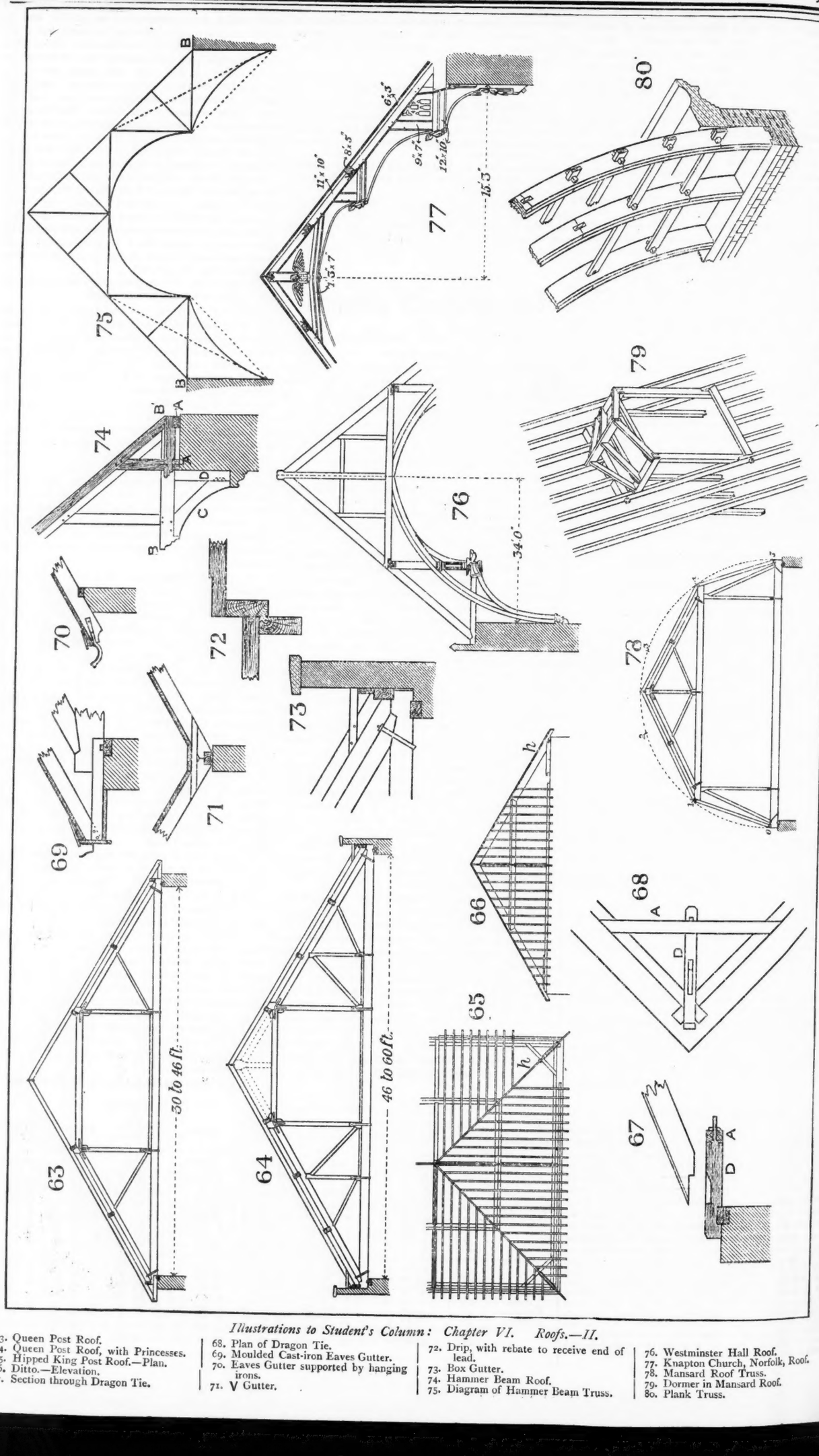
Gutters—boarded and lead-lined—are either placed behind brick or stone parapets, behind chimneys in a sloping roof, or occur at the meeting of two roofs. The latter are called V-gutters, and are formed, as shown (fig. 71), by framing gutter-bearers between the feet of the rafters near their meeting. V-gutters should be laid to a fall of not less than 2 in. in 10 ft., and they should be not less than 9 in. wide at the lowest point. It will be seen that these forms of gutters increase in width as they become higher, because they are framed in the slope of the roof. *Drips* (fig. 72) should be formed every 10 ft. or less to allow the plumbers to joint the sheets of lead. The rainwater is collected at certain points into *cesspools*, formed with dovetailed angles; these are usually 12 in. square, and about 9 in. deep. The rainwater is carried from these cesspools to the rainwater-pipe. Lead-flats are formed similarly to gutters, and need not be further described here.

Gutters behind parapets are sometimes formed as V-gutters or as *box-gutters;* one of the latter form is shown in fig. 73. They are regulated in regard to fall in the same manner as V-gutters, but being framed between vertical pieces of stuff, are the same width throughout.

Mediæval roofs.—During the Middle Ages, forms of roofs of various types were used. These were either what is known as "open timber" roofs, or roofs which merely covered the stone vaulting, and were not visible from below. The combinations of the latter are so various, in order to accommodate themselves to the height of the vaulting, that we can hardly discuss them here; suffice it to say that the principles enunciated in the foregoing examples were applied with ease to these new needs.

In the open timber roofs, the tendency was to

Trusses 10 ft. apart.	Span in feet.	Tie-beam; depth includes 3 in. for joints.	Principal rafters.	Queen-posts.	Struts.	Straining beam.	Purlins.	Common rafters.
		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Queen-truss. No ceiling.	32	4½ by 4½	4½ by 4½	4½ by 2½	4½ by 2½	4½ by 5½	5 by 7½	2 by 3½
	34	4½ by 4½	4½ by 5	4½ by 2½	4½ by 2½	4½ by 6	5 by 7½	2 by 3½
	36	4½ by 4½	4½ by 5	4½ by 2½	4½ by 3	4½ by 6½	5 by 8	2 by 4
	38	4½ by 4½	4½ by 5½	4½ by 2½	4½ by 3½	4½ by 6½	5 by 8	2 by 4
	40	4½ by 5	4½ by 5½	4½ by 2½	4½ by 3½	4½ by 7½	5 by 8½	2 by 4½
	42	5 by 5	5 by 5½	5 by 2½	5 by 3½	5 by 7½	5 by 8½	2 by 4½
	44	5 by 5½	5 by 5½	5 by 2½	5 by 3½	5 by 8	5 by 8½	2 by 4½
	46	5½ by 5½	5½ by 5½	5½ by 2½	5½ by 3½	5½ by 8½	5 by 8½	2 by 5
Queen-truss. Ceiled to tie-beam.	32	4½ by 7½	4½ by 5½	4½ by 3	4½ by 2½	4½ by 6½	5 by 7½	2 by 3½
	34	4½ by 7½	4½ by 5½	4½ by 3	4½ by 2½	4½ by 7½	5 by 7½	2 by 3½
	36	4½ by 8½	4½ by 6½	4½ by 3	4½ by 3	4½ by 8½	5 by 8	2 by 4
	38	5 by 8½	5 by 6	5 by 3	5 by 3	5 by 8½	5 by 8	2 by 4
	40	5 by 9	5 by 6½	5 by 3½	5 by 3½	5 by 9	5 by 8½	2 by 4½
	42	5½ by 9	5½ by 6½	5½ by 3½	5½ by 3	5½ by 9	5 by 8½	2 by 4½
	44	5½ by 9½	5½ by 6½	5½ by 3½	5½ by 3½	5½ by 9	5 by 8½	2 by 4½
	46	5½ by 10	5½ by 7½	5½ by 4	5½ by 3½	5½ by 10	5 by 8½	2 by 5



Illustrations to Student's Column: Chapter VI. Roofs.—II.

63. Queen Post Roof.
64. Queen Post Roof, with Princesses.
65. Hipped King Post Roof.—Plan.
66. Ditto.—Elevation.
67. Section through Dragon Tie.
68. Plan of Dragon Tie.
69. Moulded Cast-iron Eaves Gutter.
70. Eaves Gutter supported by hanging irons.
71. V Gutter.
72. Drip, with rebate to receive end of lead.
73. Box Gutter.
74. Hammer Beam Roof.
75. Diagram of Hammer Beam Truss.
76. Westminster Hall Roof.
77. Knapton Church, Norfolk, Roof.
78. Mansard Roof Truss.
79. Dormer in Mansard Roof.
80. Plank Truss.

do away with the tie-beam at the base of the roof in order to give an appearance of more height to the interior. The pitch adopted was considerably steeper than the slate roofs already noticed; for during the thirteenth century it was often as much as 60 deg. In the later periods the pitch gradually decreased until at the end of the fifteenth century it became almost flat.

Passing to the open *Hammer-beam* type of roof, which, especially in England, is the great glory of the style, a section is given (fig. 74) from which the principles of the construction can be understood. The hammer-beam BB′ occupies part of the position of a tie-beam, part of which may have been cut away in order to test the new form. The hatched portion shows the foot of a rafter in a wide wall; the light portion the position and form of the hammer-beam, the outer end of which is tenoned or halved, and pinned on to the wall-plates A, which were usually placed with their widest sides on to the wall, and were strutted between so as to be thoroughly connected one with the other. It will be observed that the inner end of the hammer-beam is supported by a curved brace C, which is supported on the wall-piece D, which, in its turn, is often supported on a carved corbel stone. The curved brace is mortised, tenoned, and pinned into the wall-piece and inner end of the hammer-beam, which from this point supports a strut E, which is carried up to the principal rafter which it helps to carry.

The importance of this form of construction is that it really shortens the effective span of roof, because the whole length of the hammer-beam may be said to have a solid bearing. Another point to be observed in these roofs lies in the fact that the thrust of the roof, if any, is brought very much lower down the wall, which in consequence is less liable to be thrust out. Fig. 75 is a section of a hammer-beam truss, in which the dotted lines show the lines of resistance, and B B being the level of the tops of the walls, it will be seen that the pressures are directed to the foot of the curved brace. The late Mr. G. E. Street, in his paper on English woodwork, read before the Royal Institute of British Architects in 1865, refers to the curved brace which distinguishes the roof of Westminster Hall from other examples (fig. 76) as a source of strength to this type of roof.

A well-known hammer-beam roof for a small span is that of Knapton (fig. 77), which is given, as also the scantlings of the various parts. During the fourteenth and fifteenth centuries especially, many examples of this type of roof exist, and several are well executed in Brandon's "Mediæval Roofs," to which the student is referred, as also to existing examples, as Westminster Hall (68 ft. span), Hampton Court (40 ft. span), Eltham Palace (36 ft. 3 in. span), and to many examples in the country, Norfolk and Suffolk being especially rich in such specimens of carpentry.

Leaving the Middle Ages, we find that in the Renaissance period in France *Mansard roofs* (fig. 78) were much used, and were so called after the name of the architect who invented it. It has always been condemned for its supposed want of beauty, but nevertheless has been largely used. Its origin may be derived from the desire to diminish the height of the upper portion of steep roofs. The illustration (fig. 78) shows the method usually adopted in setting out this roof, as well as an ordinary type of construction, in which the upper portion is merely a king-post truss. The next illustration (fig. 79) shows the method for forming a dormer window in this form of roof.

Philibert Delorme, a French architect, was apparently the first to realise the saving in expense by using timbers in small sections. His method was that of a semi-circular *plank truss* (fig. 80), which is made out of two thicknesses in pieces about 4 ft. long, laid together so that the joints of one set come in the middle of the length of the other. The planks for a span of 25 ft. may be 8 in. wide and 1 in. thick, and for 100 ft. 13 in. and 3 in. thick. These ribs are placed 2 ft. apart, and are connected longitudinally by ties, 1 in. to 1½ in. thick by 4 in. wide, which pass through mortises in the planks, to which they are pinned by keys, 1 in. by 1½ in., driven against the sides of the ribs. Even these may be dispensed with if boarding is nailed across the trusses. This system is useful for temporary exhibition buildings, and has, in some form or other, been largely used for the great exhibitions both at home and abroad.

OBITUARY.

MR. JOHN STEWARDSON.—Several well-known American architects have met with sudden death of late. Mr. John Stewardson, of Philadelphia, who was drowned early in January, was a member of the firm of Cope & Stewardson, and was one of the best known and most active architects in that city. His buildings were mostly confined to Philadelphia, but within this range he had already accomplished a great deal that marked him as one of the most competent men in the profession in America. He belonged to the younger generation of Philadelphia architects, who have done so much to remove the architectural stigma which has long rested upon that conservative city. Although Mr. Stewardson had studied at the Ecole des Beaux-Arts in Paris, and was an ardent admirer of the French system, his work was entirely free from a studied Classicism: his art was fresh and original, spirited, well-studied, and always interesting. At the time of his death he was engaged in an extensive series of dormitories for the University of Pennsylvania, for which he had made considerable study in England.

MR. A. PAGE BROWN.—Quite as serious a loss to American architecture was the death of Mr. A. Page Brown in San Francisco, California, who, in a relatively short time, had acquired a large practice in this far-distant city on the Pacific. Of all the architects who have settled in San Francisco, his work was, perhaps, the most refined and interesting. It was quite without that provincial feeling that characterises so much of American architecture in the far west, and was not only superior to the larger amount of work around it, but was quite the equal of the best work in the east. Mr. Brown studied architecture in the office of the well-known firm of M'Kim, Mead & White in New York, and the influence of his training was clearly indicated in his work.

M. H. DESCAVES.—The death is announced of this architect, who was member of the French "Société Centrale," and a pupil of Questel. He was appointed in 1864 an official architect of the department of "Bâtiments Civils," and in that capacity he carried out the stables at Montiérender, the church at Marbiéville, the monument to General Thiébaut at Montmédy, the restorations to the château of Val-des-Écoliers, and the church of Notre Dame at Vassy. M. Descaves appears to have suffered severely in spirits from the circumstance of his name, without any known cause, having been erased from the list of architectural experts attached to the "Tribunal Civil de la Seine," and in a fit of dejection committed suicide. He was fifty-five years of age.

M. AUGUSTE BARRE.—We have also to record the death of this eminent French sculptor and medallist, who in 1852, was commissioned to design the Imperial coinage bearing the head of Napoleon III. He was born at Paris in 1811, and was the pupil of his father and of Cortot. He executed a certain number of remarkable works. Among the best may be named the group of "Ulysses and his Dog," in the Salon of 1834; "François de Lorraine" (1840); "La Duchesse de Penthièvre" (1847); a marble statue of the Empress Eugénie, another of the Princesse Mathilde, and two statues of Berryer. He had received medals in the Salons of 1834 and 1840, and the Legion of Honour decoration in 1852.

SIGNOR FIORELLI. — By the death of Signor Fiorelli, which occurred last week at Naples, Italy loses an archæologist who has served the cause of science for more than half a century. Born at Naples in 1823, he was Inspector of Pompeian Excavations from 1845-1849. In 1860, under the new organisation, he became Inspector of Antiquities for Southern Italy and Professor of Archæology at Naples, and, finally, in 1875, Director-General of the National Museums and of Excavations. He was not a great archæologist. Though his name constantly appeared in Italian archæological periodicals, he never made his mark by original work, but he was an able, conscientious official, and few are the archæologists who visited Rome without owing something to his courtesy.

GENERAL BUILDING NEWS.

RESTORATION OF FLINTHAM CHURCH, NOTTS. —On the 30th ult. the Parish Church of Flintham was re-opened after undergoing restoration and renovation. The Church of St. Augustine, Flintham, is, says the *Nottingham Guardian*, of great antiquity, a portion of the tower being of pre-Norman work, although so altered by more recent additions that the early work is only visible inside the upper stages of the tower. Whatever was the original form of the building, it was in the thirteenth century cruciform, consisting of nave (and probably aisle), chancel, transepts, and central tower. Of these, the chancel and tower alone remain as then built, the nave having been rebuilt in 1827, and the transepts entirely destroyed, the arches leading into them being built up. The chancel is a simple but very pleasing example of Early English work, with lancet windows on the north and south, and a Late Perpendicular one at the east end. The two lancets nearest the west end are interesting as having hooks and recesses for shutters to their lower parts. Before the recent work the nave, which is rather low and broad, with a flat plaster ceiling, had very high pews and a large gallery at the west end, whilst the entrance was on the south side of the tower. The gallery has been removed, the nave seated with low, open seats, a door and inner porch formed at the south-west end, and the font, which was formerly built into the wall under the north arch of the tower, has been repaired and placed at the west end of the nave. On the south side of the tower, in place of the doorway, a two-light window has been inserted, making the central portion of the church, which before was quite dark, sufficiently light to be used for the choir, and the altar has been brought forward to the centre of the chancel, a constructional retable and reredos being formed behind it. The flat ceilings of nave and tower have been improved by ribs and cornices, while the flat wooden Perpendicular roof of the chancel has been repaired, and now forms a ceiling to the new high-pitched roof placed over it. This new roof is covered with cast lead. A further improvement to the external effect has been the addition of a high pyramidal roof to the tower, giving the church the elevation above the surrounding buildings that it so greatly needed. Various other smaller improvements have been made, the principal one being a new oak pulpit on a stone base. The whole of the work has been carried out by Messrs. E. Bowman & Sons, of Stamford, from the designs of Mr. C. Hodgson Fowler, F.S.A., of Durham.

BANK PREMISES, BRISTOL.—New premises have just been built for the Capital and Counties Banking Company, Bristol. The main entrance will be from Clare-street, and specially-selected Bath stone has been used in this façade. Over the Clare-street entrance are fixed the arms of the bank, the pediment surmounting this being supported by a Sphinx at each side. The gates have been arranged to run in recesses behind the piers, and are to be of solid bronze and wrought-iron; also the grilles for the windows. In the Baldwin-street frontage grey granite, imported from Belgium, where it was worked into shape, has been used somewhat freely; with this exception the general style is much after the fashion of that in Clare-street. In the interior the old rooms above the bank-room ceiling have been retained, and these and their walls had to be supported on massive joists. All the woodwork is to be of the best Spanish mahogany, and the counter will be mainly composed of mahogany, though the outside edge to the depth of 10 in. will be of green Algerian onyx. The screen is 2 ft. in height and 30 ft. long, made of polished bronze, from designs specially prepared by the architect. The floor of the public office is to be laid with mosaic, and the whole of the building, from basement to top floor, is to be heated by hot water and lighted by electricity. Below the floor of the public office are the strong-rooms. Mr. Milverton Drake is the architect, and Mr. C. A. Hayes the contractor for the new premises.

FIRE BRIGADE STATION, NEWPORT, MONMOUTH.—A new fire brigade station has just been built at Newport. The premises have been erected from designs by the Borough Engineer (Mr. R. H. Haynes). The premises comprise engine-room, watch-room, workshops, stores, stables for two horses, hose drying-tower, men's recreation-room, secretary's office, tenements for four resident firemen (four rooms for each man), and a shed for storing fire-escapes. The place is equipped with electric light, electric bells, telephones to the Exchange, police-station, and the residence of every member of the brigade.

ADDITION TO SLATEFORD HOSPITAL, EDINBURGH.—At a meeting of the Suburban District Committee of the Mid-Lothian County Council, held in the County Buildings, Edinburgh, on the 4th inst., a report by the Sub-Committee on Public Health was read, which contained a report by the Hospital Sub-Committee with reference to the proposed addition to the hospital at Slateford. The Sub-Committee had before them several sets of plans by Messrs. Spiers & Co. for the addition required, and, with the concurrence of Dr. Brock, they recommended for adoption a plan which provides male and female wards for typhoid, an additional nurses' bedroom, and a convalescent ward, and a linen-closet. The report was unanimously adopted.

CONSTITUTIONAL CLUB, BOVEY TRACEY, DEVONSHIRE.—A new Constitutional Club has just been opened at Bovey Tracey. The main elevation of the building, towards Fore-street, has walls of red-pressed bricks, relieved with buff bricks and cement dressings, the roof being covered with grey slates. The building is three stories in height. On the ground floor is a central entrance with reading and card rooms (each about 18 ft. by 12 ft.), hall, staircase, and lavatories, &c.; and in the wing behind, kitchen, scullery, and other offices for the use of the caretaker. On the first floor, extending the full length of the frontage, is a meeting-room, with a projecting balcony from the centre window opening over the main entrance, and in the wing lavatory and retiring-rooms. On the second floor is a billiard-room, lighted by a lantern light in the roof, and there is a small committee-room adjoining. In the wing are bedrooms for the caretaker. The works have been carried out by Messrs. Winsor-Aggett & Mardon, of Bovey Tracey, from the designs and under the supervision of Messrs. J. W. Rowell & Son, architects, of Newton Abbot.

PUBLIC HALL, LEDBURY, HEREFORD.—A public hall has been erected in contiguity with the Royal Oak Hotel, Ledbury. It is 80 ft. long and 30 ft. wide, with a height of 17 ft. 6 in. to the top of the walls, and of 24 ft. to the centre of the ceiling. There are eleven large windows, all of them above

the transomes, and four ventilating shafts in the roof. There are four ante-rooms. A lift has been provided, connecting with the kitchen, for use in cases of banquets. There is also a fixed stage, which is 20 ft. deep and 30 ft. wide. The floor space will, it is calculated, seat an auditory of 700 to an entertainment, 350 to dinner. The main entrance to the hall is from the street by way of a fireproof staircase, 5 ft. wide, covered in by a glass roof, there being, in this respect, no communication with the hotel. There is also a private stage entrance and two additional exits. Mr. G. H. Godsell, Hereford, was the architect; Mr. G. Hill, Ledbury, the builder.

MASONIC TEMPLE, GOUROCK, RENFREWSHIRE.—On the 1st inst. the foundation stone was laid at Gourock of a new Masonic Temple. The building, which is situated in John-street, is 45 ft. in length, and about 33 ft. broad. It is built of red sandstone on the frontage to John-street, and the sides and back are of brick. It is set back 10 ft. from the street, the space thus left being enclosed by an iron railing, while a flight of steps leads up to the main entrance. The contractors for the various sections of the work are:—Builders, Messrs. J. & R. Kirk, Greenock; joiner, Mr. W. S. Tarbett, Gourock; plumber, Mr. John M'Jannet, Gourock; plasterer, Mr. M. Slaven, Gourock; and slater, Mr. J. Callendar, Gourock. Mr. Jas. B. Stewart, Greenock, was the architect.

PROPOSED NEW THEATRE FOR LEEDS.—It is proposed to build a new theatre at Leeds. The ground has a frontage to Woodhouse-lane on the east side of 130 ft., to Wormald-row on the north of 156 ft., to Guildford-street on the south of 125 ft., and to Albion-street on the west of 57 ft. The total superficial area is 2,500 square yards. The theatre, which is to have its principal entrances from Guildford-street and Woodhouse-lane, will be capable of accommodating some 3,000 persons, and the plans are by Mr. Frank Matcham.

SHELTER AND TRAMWAY WAITING-ROOM, BRISTOL.—It is proposed to erect a shelter and tramway waiting-room at St. Augustine's Bridge, Bristol. The City Engineer (Mr. T. H. Yabbicom) has submitted plans for a shelter to the Sanitary Committee. The plan was adopted, and it was decided to submit it to the Council at their next meeting for approval. The plan of the building has been decided by the triangular shape of the site, surrounded by a footpath 12 ft. wide on each side. The waiting-room, of hexagonal shape, inscribed within a circle of 35 ft. diameter, is placed in the centre of the building, and on the three sides are glazed doors. The lavatories and tramway parcel office will be placed in the corners of the triangle. The tramway parcel office will be approached from the street adjoining Colston-avenue. The building is designed in the Renaissance style, and is faced with Bath stone ashlar work. The façades on the three sides are similar in design, and measure 64 ft. in width. The centre of the building, which is hexagonal, is carried up to a height of 24 ft., measured from the footpath to the top of the balustrade, and is surmounted by a pediment containing a clock, the height to the top being 32 ft. The panels between the lavatory windows and main pilasters are filled in with carved heraldic designs of civic interest. The engineer estimates the cost of the building at 3,000*l.*

SCHOOLS, MOUNTPOTTINGER, BELFAST.—The new schools which have been erected in Lord-street, Mountpottinger, in connexion with Ballymacarrett parish church, have just been opened. The building, which is capable of affording accommodation for some 600 children, is divided into an upper and a lower schoolroom, and later on it is intended to enlarge it by the addition of class-rooms. The work has been carried out under the supervision of Mr. S. P. Close, architect, by Mr. William Kerr, builder.

PUBLIC OFFICES, ELLAND, YORKSHIRE.—The new premises of the Elland Urban District Council comprise a council chamber, furnished in pollard oak, offices for clerks and collectors, and other rooms. The buildings, which have a frontage to Southgate, have been erected from designs by Messrs. Horsfall and Williams, architects, Halifax.

SEASIDE HOME FOR WORKING MEN, ST. MARGARET'S BAY, DOVER.—For some time past, says the *City Press*, the committee of the Morley House Seaside Convalescent Home for Working Men have been considering the advisability of enlarging the Home by replacing some of the old portions of the house by more commodious and modern buildings. It has now been definitely decided to pull down what is known as the old wing, and to erect a new wing from the plans prepared by the hon. architect, Mr. G. D. Stevenson. The Home is situated near Dover, between St. Margaret's Bay and Martin Hill. The proposed new wing will contain on the ground floor a dining hall, 50 ft. by 30 ft., an entrance hall, a committee room, a master's room and office, and portions of the administrative offices. On the upper floors will be provided a visitors' room, a matron's room, and fourteen dormitories, with bath rooms, &c., the accommodation being thus brought up to 120 beds.

PARISH CHURCH, CAMBUSLANG, LANARKSHIRE.—The improvements in Cambuslang Parish Church, which have been going on for the past ten months, and the erection of an organ, have just been completed. The estimated cost of the alterations and erections, including the new organ, was a little over 1,500*l.* The plans for the alterations were by Mr. A. Lindsay Miller, architect, Glasgow and Cambuslang. The organ is the work of Messrs. Abbott & Smith, of Leeds.

MODEL LODGING HOUSE, CLERKENWELL.—There has just been opened in the neighbourhood once known as Coldbath Fields, a new building erected by the Rowton Houses Company for the use of artisans and labourers who reside in the district. The building has a frontage of 200 ft. to Calthorpe-street, and of 125 ft. to King's-cross-road. The façade is of pressed facing bricks, relieved by pink bricks and terra cotta. The courtyard, round three sides of which it stands, is capacious, and the walls here are of ivory-white glazed bricks up to the top of the first-floor windows. Portland cement mortar has been used throughout. The floors are fireproof, of coke-breeze and steel. The basement is utilised as a kitchen, a scullery, a larder, a service lobby, and stores, as well as a lavatory, and foot and other baths, dressing-rooms, barbers' and tailors' shops, &c. All the basement and the staircases are lined with ivory-white bricks. On the ground floor are two dining-rooms, with seating for 376 men at a time. Near at hand is a lodgers' scullery for those who choose to cook their own food, and there is also a room for crockery and service. There is a shop opening into both the dining and the smoking-room. A reading-room is provided, with seats at the tables for 104 men, besides arm-chairs. Fumigating and drying-rooms have been provided. On the landings are closets and sinks, and a supply of drinking water, as well as a bedmaker's room. Two male officials sleep on each floor, and the gas is under the control of one of these, while the entire supply is also capable of being governed from the superintendent's rooms on the ground floor. There is sleeping accommodation for 677 men, on six floors, and each cubicle has a window under the control of the occupant. Two fireproof staircases, carried up to the roof, afford access to the corridors, and each floor is divided by walls into seven sections. The architect was Mr. H. B. Measures.

SCHOOL, GRANGEMOUTH, STIRLING.—The Technical School erected on a feu adjoining the Grangemouth Public Park by the Grangemouth School Board has just been opened. The building, which has been built in accordance with plans designed by Mr. G. Deas Page, architect, Falkirk, is three stories in height, the basement-floor being used for the heating apparatus, storage, &c. On the ground floor are situated class-rooms, lavatories, teachers' rooms, and large central hall. The upper floor rooms are fitted up as drawing-room, workshop, cooking-room, laboratory, and gymnasium. The floors of central hall, landings, corridors, &c., are composed of steel joists and granolithic pavement, and the walls of the same are lined with tiles. The laboratory is fitted up with all the latest appliances, including fumigating chambers. The furniture and fittings are of oak, red stone from Locharbriggs Quarry, Dumfries, being used externally. The heating is on the low-pressure system, with automatic ventilation throughout. The conveniences and play-sheds are lined with enamelled bricks. The site, over two acres in extent, is enclosed within boundary walls. The building provides accommodation for 864 scholars, and will cost about 8,300*l.* The style is Renaissance.

SANITARY AND ENGINEERING NEWS.

WOKING MAIN DRAINAGE.—An inquiry was held at Woking on the 30th ult., by Major-General Crozier, R.E., into an application for sanction to borrow 50,000*l.* for the purpose of a drainage scheme, and with reference to a provisional order to enable the local authority to acquire certain land required for the purposes of the works. The scheme before the Inspector was prepared by Messrs. Taylor, Sons and Crimp, of Westminster, and the details were explained by Mr. Santo Crimp, M.Inst.C.E., from which it appeared that the population to be drained amounted to about 10,000 persons extending over a very large area, necessitating the construction of twenty-five miles of sewers, whilst there were four low places in the district from which the sewage had to be lifted by mechanical means. It was intended to employ hydraulic machinery for transmitting the power, the length of mains required being about six miles. As the volume of sewage to be raised at each station was small, it was intended to use water at the comparatively low pressure of 220 lbs., the waste water, after passing through the motors, being employed for flushing purposes. The system of mains for transmitting the power would also supply several flushing stations situated upon their route, thus providing the necessary water without having to buy it for the purpose. It was intended to ventilate the sewers by means of shafts placed at suitable points and carried up sufficiently high to admit of the sewer-air escaping without giving offence, and the system was divided into sections both for flushing and ventilating purposes. The gravitation outfall sewer which drained about 90 per cent. of the area had a discharging capacity of 4½ million gallons per twenty-four hours. Upon arriving at the proposed outfall works it was intended to clarify the sewage by means of settling-tanks and filters, and then to apply the sewage for final purification to land, of which it was intended to clarify 42½ acres. Filter-presses were to be employed for dealing with the sludge, and the scheme was designed to meet the requirements of about 20,000 people, the district being a favourite residential one, and likely to grow rapidly when provided with efficient means of drainage.

PLYMOUTH DRAINAGE.—Mr. James Mansergh, C.E., has made a report to the Special Drainage Committee on the suggestion which was made to the Plymouth Borough Council in November last that a temporary pumping-plant should be erected at Rusty Anchor to pump the flood-waters out of the storage-tanks when the tidal waters prevented a free outlet therefrom, and so avoid the occasional flooding of the houses in the low parts of the western district. He points out that the area of the present district drainage to the low-level tanks at Rusty Anchor is 272 acres, and that under his scheme for dealing with the drainage of the extended borough only 107 acres will be left to drain into these tanks. The suggested pumping-plant would, however, have to be powerful enough to cope with the flood-waters for the whole 272 acres, and he estimates the cost at 5,000*l.*

DRAINAGE CANAL OF THE PLAIN OF MEXICO.—A paper on "The Drainage Canal of the Plain of Mexico" was read at the Society of Arts, John-street, Adelphi, on the 5th inst., by Mr. F. H. Cheesewright, M.I.C.E. The drainage is effected by means of a canal some forty miles long that intersects some of the lakes, the waters thus collected being carried through the base of one of the mountains by means of a tunnel between six and seven miles long. The work was commenced by the Aztecs in 1450, and has been continued until the present time. For the last five years Messrs. S. Pearson & Son, contractors, of London, have been busily engaged dredging the canal, and the formal opening is arranged to take place in the autumn, thus completing a work that has occupied 500 years to construct at a cost of nearly 8,000,000*l.* in money.

STORM-WATER AT PLYMOUTH.—Major-General Phipps-Carey, R.E., held an inquiry at Plymouth, on the 5th inst., relative to an application from the Corporation for a loan of 1,800*l.* to carry out works of storm-water drainage in Hawker's Avenue. Mr. J. P. Ellis, Town Clerk, and Mr. J. Paton, Borough Surveyor, were among those present. The Town Clerk briefly explained the necessity of building an overflow in Exeter-street, a low-lying portion of the town, and liable to floods. The Surveyor detailed the scheme from plans prepared, which was to facilitate in times of excessive rainfall the discharge of the existing sewer, which served a portion of the eastern area of the borough, and discharged at an outfall in Deadman's Bay. The district was closely built upon, consisting of streets of houses, with a greater portion standing at a considerable elevation. The surface-level at the point at which they proposed to construct the sewer was 12-30 above ordnance datum. During storms the man-holes in the streets have been forced up, and in the vicinity of Hawker's-lane the water rose and flooded several of the houses and receded, leaving a thick deposit of mud. Last year there were four floods, the water rising 6 in. over the surface of Exeter-street, and to 24 in. in some of the cottages. As the existing sewer was of too shallow a depth to serve anything but a moderate fall, they proposed to supplement it by laying down two pipes, 36 in. in diameter, and providing cast-iron pipes 4 ft. 6 in. in diameter, placed in the quay-wall to meet the tidal flap, allowing a level of 2 ft. above the level of ordinary high tides. The overflow would discharge 8,926 cubic ft. per minute. Mr. Paton thought the level might not be effective in the case of an exceptionally high tide, but he had to meet a complaint from the Sutton Harbour Company, who objected to the overflow being raised above 9 ft. 6 in., as it would interfere with the shipping.—The Inspector, considering that the grievance would not be effectually remedied, recommended an amendment, by which there would be two outlets, one at a high and the other at a low level, which would necessitate an increase in the loan.

FOREIGN.

FRANCE.—The group of Syndical chambers of the "Industrie du Bâtiment," a large and important body, has entered a protest against the proposed curtailment of the scheme of the 1900 exhibition, and petitions for the carrying out of the original plan.——MM. Thiebaut, the well-known founders, have just completed the casting of the five gates for the Church of Notre Dame de Fourvières at Lyons. The design of the gates is by M. Sainte-Marie Perrin, architect, of Lyons.——On the 28th the new Mairie of the Xth Arrondissement is to be opened. M. Rouyer is the architect.——The work on the additions to the Ecole des Droits is being actively carried on under the direction of the architect, M. Lheureux, and it is expected the building will be completed in November 1896. The new façade of the Lycée Louis-le-Grand, adjoining, is also nearly completed.——The jury in the competition for the rebuilding of the Hôtel de Ville of Montdidier has awarded the first premium to M. Schmit, of Paris; the second to M. Emile Richard also of Paris; and the third to

M. Baes, of Montdidier.——Only five artists have been judged worthy to enter the second competition for the monument to Carnot at Lyons. The final award will be given in May.——The fortifications of the town of Cambrai are to be demolished and replaced by large boulevards.——The rebuilding of the church tower of St. André, in the higher Alps, which was destroyed by lightning, has been commenced.——A number of portrait statues of eminent persons are shortly to be commissioned, to decorate the main quadrangle of the new Sorbonne.

WASHINGTON CATHEDRAL.—The plans for the Episcopal Cathedral of St. Peter and St. Paul, for which a site of twenty acres has been bought at Woodley, the suburb of Washington, D.C., in which, President Cleveland's summer home is situated, are now on exhibition at the Pennsylvania Academy of Fine Arts in Philadelphia, and will be exhibited at the Academy of Design in New York at its coming exhibition this month. Mr. Ernest Flagg, of New York, the architect selected by the Building Committee of the Trustees, submitted at their request designs in both the Gothic and Renaissance styles. The Renaissance design accepted has a ground plan 272 ft. long and 200 ft. wide, a niche in front and a choir at the rear slightly increasing the length over the breadth. The cruciform interior will be 176 ft. by 224 ft., with a rotunda 208 ft. in height, and have a seating capacity of 3,500. The external features will be a dome 280 ft. high and four spires 312 ft. high, and the niche in front, which will be 80 ft. in diameter, with its vaulted roof supported by a series of Corinthian columns. Besides the cathedral proper it is planned to have a theological seminary, a boys' and a girls' school, two chapels, the Bishop's palace, a deanery, a chapter-house, convention hall, and many smaller buildings, the whole cost being estimated at about 4,000,000 dols., of which the cathedral will cost nearly 3,000,000 dols.—*Engineering Record.*

CALCUTTA AND THE HOOGHLY.—What is to be done with the Hooghly? is the question that has been exercising the minds of all who have more or less material interests in the existence of Calcutta, the capital city of India, as a port. The Hooghly of 150 years ago, or even of fifty years ago, is certainly, where navigation is concerned, not the Hooghly of to-day. The navigation of the river, from its entrance to the city of Calcutta, is daily becoming more troublesome and difficult, and within the past few months the problem of successfully piloting one of our modern leviathans up or down its broad but treacherous expanse of water, has entailed anxious consideration on the part of those entrusted with the conservation of the port, with no nearer approach to a solution than before it was taken up. Recently the Bengal Chamber of Commerce addressed the local government on the subject, pointing out how perilously near to a practical closing of the port, against ordinary sized vessels, was the existing condition of the navigable channels of the river.—*The Indian and Eastern Engineer.*

MISCELLANEOUS.

BRADFORD SOCIETY OF ARCHITECTS AND SURVEYORS.—The annual meeting of this Society was held on the 31st ult. at the Great Northern Victoria Hotel. Mr. Ledingham was elected President for the ensuing year, and Mr. Fairbank was re-elected secretary.

THE "BOUHON" VENTILATING COWL.—Mr. Goldman, the English agent for this patent (illustrated page 124 *ante*), writes to say that it is a Belgian invention, not a French one, as stated in our notice. The circular describing it was in French, which led to the mistake.

MITCHELL'S HOURLY WAGES TABLE.—This is a re-issue of a useful sheet which we have before had under our notice, in which the amounts of wages from 1d. per hour to 1s. 8d. per hour, for any number of hours from one to sixty, are shown at a glance. The hourly rates are given for halfpenny fractions, but not down to farthings, which sometimes come into the reckoning of wages: the halfpenny division is, however, sufficient for general use.

THE RAILWAY ACCIDENT AT ST. NEOT'S.—Major Marindin reports to the Board of Trade on the accident which occurred at St. Neot's on November 10 to the down Scotch express. He says:—I have no hesitation in attributing the accident to the breaking of the southernmost of the two broken rails. The rail, it appears, was an old one—one of a small lot of 500 tons of Bessemer steel rails supplied in 1872-73 by the Railway Steel and Plant Company, Manchester. It is now certain that the weight of the rails, originally 80 lbs. per yard, has been reduced to 70 lbs. per yard in the case of the southernmost rail, presumably the first to break, and to 72·3 lbs. per yard in the case of the other rail. It is, in my opinion, clear that rails of this reduced section and weight per yard are not of sufficient strength for use on a line run over by engines of the greatly increased weight now employed. I would strongly urge the Great Northern Railway Company to increase the weight of their standard rail for main lines—now 84 lbs.—to at least 90 lbs. per yard, and to replace by new rails all the old 80 lbs. rails on the main line where much worn.

FIRE AT SINGLETON ABBEY, LANCASHIRE.—A serious fire broke out on the 4th inst. at Singleton Abbey, the residence of Lord Swansea. The whole of the servants' quarters and servants' effects were destroyed. Valuable pictures and other noted treasures, which were in the new wing of the building, were saved.

CHANGES OF ADDRESS.—Mr. R. T. Beckett, architect, has removed from Hartford, Cheshire, to 1, Victoria-street, Liverpool.——We are asked to state that Messrs. Mellowes & Co., of the "Eclipse" Glazing Works, Sheffield, have removed their London Offices to 28, Victoria-street, Westminster, S.W.

PARTNERSHIP.—Mr. Fred. A. Donnison and Mr. Fred. Berlyn, who have been associated with Messrs. Roger Dawson, Limited, since the formation of this company, have started business on their own account as electrical engineers, under the style of Fred. A. Donnison, Berlyn, & Co.

SOUTH KENSINGTON MUSEUM.—We are requested to state that the arrangements are now complete for lighting in the evening the "Southern Galleries" of the South Kensington Museum on the west side of Exhibition-road, which contain the collections of machinery and naval models. These galleries will be open free to the public from February 17 on three evenings a week—Mondays, Tuesdays, and Saturdays, till 10 p.m.—in the same manner as the main building.

APPOINTMENT OF SANITARY INSPECTORS.—The Local Government Board has sanctioned the appointments of Messrs. Harvey, Wood, Bobbitt, Morley, High, and Ellis as Sanitary Inspectors in Hackney; and of Mr. J. J. Sargent as Sanitary Inspector in Newington.

AN APPARENT THEFT OF STONE.—According to the *City Press*, about 80 tons of stone which had been stored by the local authorities on the open space called Mile End Waste for repairing the roads in the neighbourhood, have disappeared. The statement seems rather extraordinary, for it is certain that 80 tons of stone could not have been surreptitiously removed. If unlawfully removed, it must have been done by people with carts personating the official *employés*; but that any such proceeding should be possible argues a curious degree of blindness or inattention on the part of the authorities.

NATIONAL ASSOCIATION OF PLUMBERS.—The quarterly meeting of the National Association of Master Plumbers of Great Britain and Ireland was held on the 31st ult., at the Grosvenor Hotel, Hull. The delegates and their Hull friends, to the number of about fifty, were received at the Town Hall by the Mayor and Mayoress.—The annual dinner was held at the Grosvenor Hotel, when Mr. A. E. Biggs (Leicester) presided. Councillor Laverack, in responding to the toast, "The Mayor and Corporation of Hull," said the Corporation had never entered into competition with either plumbers or other bodies of tradesmen. He concluded by submitting the toast of "The National Association of Master Plumbers." The first thing which struck anyone in proposing that toast was that they were a very young association. In March last the local society in Hull thought that the time had come when they ought to have a wider organisation than mere local bodies. They came to the conclusion that the best course to adopt was to form a National Association. The vigour and energy with which they took the matter up, and followed it up, was shown in the very large number of members they now had in various parts of the country. The objects of the society were, of course, of common interest. They had common dangers and common difficulties to meet. Their interests were identical, and it seemed to him that no better method of furthering their interests could be arrived at than by combination. Their aim was to promote thorough, good, honest work.—Mr. J. Beal, in responding, said that much work had gone out of their hands into that of the builders and others, and there had been a great necessity for many years for an organisation amongst *bonâ fide* plumbers. If that organisation had been formed twenty or twenty-five years ago, a great deal of the work now in the builders' hands would have been in the hands of the plumbers. There were a great number of things they were going to try and remedy. He did not know whether they would accomplish them, but if they did half of them they would have succeeded in doing a great work. Since the society started they had gained no less than 350 spontaneous members; and that after only eight months' existence was very gratifying.

REGISTRATION OF PLUMBERS.—The annual meeting of the Leeds District Council for the National Registration of Plumbers was held on the 1st. inst. in the Philosophical Hall, Leeds. Mr. John Gordon, jun., presided. The sixth annual report was read by Mr. Percy Robinson, the Secretary. It congratulated the members of the Society on the consolidation of a movement so important to the trade of plumbing and the sanitary interests of the country. Eighteen applications for registration had been considered by the Registration Committee. Of these five had been accepted and thirteen had been referred to the Examination Committee. The classes for instruction in plumbing had been well attended, the numbers on the books being seventy-one in the theoretical class and sixty-one in the practical one. A preliminary course of lectures had been arranged in order to prepare students for the more practical work of the classes, the lecturer being Mr. Holbeach, teacher of physics at the Leeds School of Science and Technology. The Chairman, in moving the adoption of the report, said the Corporation were engaged in trying to reduce the death-rate of the city, and they were about to demolish the bulk of the houses on 17 acres of land. It would be a very bad thing if, in re-erecting the houses, they had plumbers who did careless work. Plumbing was a work that was worthy of being well attended to. Much of the work connected with electric lighting would, he predicted, eventually fall upon the plumber, instead of upon the specialists who now did it.—Mr. J. W. Connon, in seconding the motion, said they had arrived at a time when the Society might expect local authorities to assist them.—The report was adopted.—Mr. Bishop, representing the Worshipful Company of Plumbers, London, moved the election of officers—including Mr. J. Wreghitt Connon as President, Mr. George Wood as vice-president, and Mr. Harry Lindley as honorary treasurer—public representatives, and masters and operative members of the council.—Mr. J. W. Willans seconded the resolution, which was agreed to.—Mr. G. Wright Clarke gave an address on the necessity of technical instruction for plumbers' work, after which the prizes and certificates were presented to the successful students.—Mr. George Wood moved the following resolution: "The movement for the registration of plumbers being one instituted in the interests of the public health, this meeting commends it to the notice of local authorities as being worthy of their active support in all available directions, and of the public representatives in Parliament as being worthy of support in any efforts to secure legislative enactments in furtherance of its objects." Mr. Joe Lindley seconded the resolution, and it was adopted, after which the meeting was brought to a close.

ELECTRIC LIGHTING OF EDINBURGH AND GLASGOW.—The Glasgow Sub-Committee on the electric lighting of the streets of Glasgow have completed their report on their recent visit to Edinburgh. The committee inspected the electric lighting of and the appliances adopted in connexion with the street lighting of Edinburgh, and in their report they state that in Edinburgh there are 247 lamps presently erected in the streets, and an additional 194 are in course of erection, which will make a total of 441, as against 112 in Glasgow. The Electric Lighting Committee of Edinburgh charge the Street Lighting Committee the sum of 20*l.* per lamp, and within a few months it is expected that the charge will be reduced to 18*l.* per lamp, which charge includes the capital expenditure defrayed by the Electric Lighting Committee in providing the pillars and globes and the appliances for the light. In Glasgow the charge is 26*l.* per lamp, and the pillars and globes are supplied by the Watching and Lighting Committee. The distance between the lamps in Princes-street, which is lighted only on one side, is stated to be forty-five yards, and in the other streets of the city the distance is about sixty-five yards, crossing the streets from lamp to lamp. The general average of the distance apart of the lamps in Glasgow is somewhat less than that of the streets in Edinburgh, excepting Princes-street. The pillars in Edinburgh are 30 ft. in height, and the height from the pavement to the centre of the light is 23 ft. In Glasgow the height of the pillar to the light is 19 ft. The Sub-Committee further report that they found that the street lighting of Edinburgh is much better than that of the street lighting in Glasgow, and that that result has been obtained by a more judicious employment of the light, and they recommend that the matter be remitted back to them to consider and report as to what measures are necessary to improve the present system of the electric lighting of the streets of the city, with power to confer with the Electric Lighting Committee of the Corporation.

STATUE TO JOHN BRIGHT.—A statue of John Bright was unveiled, on the 11th inst., in the Central Hall of the Houses of Parliament. The memorial is stated to be a striking likeness of the deceased statesman, and has been executed in white marble by Mr. Gilbert, R.A. Mr. Bright is represented as standing erect, in the act of speaking, and in his right hand is a crumpled paper. The statue is placed in the north-west corner of the hall, opposite the monument to Lord Iddesleigh.

SURVEYORSHIP APPOINTMENT.—Mr. W. H. Grieves, the assistant Borough Surveyor of Crewe, has been elected to the position of Engineer and Surveyor of the Buxton Urban District Council. These were 179 applicants, and out of this number seven were selected to appear before the Council.

AYR BUILDING REGULATIONS.—At Ayr Sheriff Court on the 6th inst., before Sheriff Orr Paterson, the Police Commissioners of Ayr applied to have the regulations for building new double cottages and villas modified in respect to the provisions of the Act of 1892, which requires the partition-walls in such houses to be carried up through and 12 in. beyond the level of the roof, and which requires walls having vents to be 27 in. in thickness throughout. After hearing the evidence of Mr. John Eaglesham, Burgh Surveyor, Ayr, and Mr. James Maclachlan, builder, Ayr, Sheriff Orr Paterson said that while reserving his judgment, he might indicate that he was not disposed to interfere with the rule that requires partition-walls to be carried up through the roof in consideration of the protection such a practice afforded against the

spread of fire, but that there did not seem so much objection to modifying the rule that requires walls with vents to be 27 in. thick throughout, and he would be inclined to require that they should be of such thickness only in the neighbourhood of the vents.

WATER-CLOSETS, LEEDS.—The builders of Leeds have often had cause to complain in consequence of the action of the Corporation Sanitary Committee in condemning structures which in plan had been approved by the Building Clauses Committee. The latter Committee, it seems, have allowed builders to erect privies, whilst the Sanitary Committee, after the owners have gone to the expense of making this type of convenience, have in many instances condemned them, and ordered the owner to substitute water-closets. With a view to seeing if some uniform principle could not be laid down which would obviate such trouble and expense in future, a conference was held on the 10th inst. at the Town Hall between representatives of the two Corporation Committees. It was pointed out that practically the only reason why some builders preferred to supply privies rather than water-closets was because they cost less. A strong feeling was expressed in favour of a by-law being passed prohibiting the erection in future of anything but water-closets. At the same time, it was resolved to approach the Waterworks Committee with the object, if possible, of inducing them to lower the water-rate charged to the owners of these places.—*Leeds Mercury.*

FIRE AT A LONDON BUILDING YARD.—A fire broke out in South Lambeth on Wednesday at the extensive premises of Messrs. Higgs & Hill, builders and contractors. The scene of the outbreak was in an extensive yard in South Lambeth-road, situated at the back of Vauxhall Park, and in close proximity to the London and South-Western Railway Station. The workmen left at the usual hour, when all was apparently safe, but shortly before nine o'clock the watchman saw fire and smoke issuing from one of the shops near large timber stacks, and at once raised an alarm. The firm's hose was quickly fixed to a hydrant, and water was poured on the flames, but despite this promptitude, the fire soon gained a firm hold and made great headway. About fifteen minutes from the time of the outbreak the flames had assumed such fierceness that fears were entertained for the safety of St. Joseph's Convent. By half-past nine several stacks of timber had been burned down, and others were well alight. Some sheds were also gutted, and two extensive gantrys were destroyed. At a quarter to ten several more stacks of timber had become ignited, but all danger to the convent was past. The fire was kept within a certain section of the yard, and the stonemasons' department, where work is being carried out for the new art gallery, on the site of old Millbank Prison, did not suffer. The outbreak is believed to have occurred in one of the moulding sheds.

LEGAL.

IMPORTANT POINT UNDER THE METROPOLIS MANAGEMENT ACT, 1862:

CASE IN THE DIVISIONAL COURT.

THE case of the London County Council *v.* Pryor came before a Divisional Court of Queen's Bench, consisting of Justices Lawrence and Collins, on Monday last, it being a special case stated by a Metropolitan Police Magistrate, raising the question as to whether a certain building in Prince George's-road, Stoke Newington, came within Section 74 or Section 75 of the Metropolis Management Act, 1862. If it came within the former Section compensation would have to be given for setting it back to the general building line, and if under the latter, an order for demolition might be made. The facts are as follows:—

The respondent, on April 1, 1895, appeared before the Magistrate to answer a complaint that, on October 20, 1894, at the northern side of Prince George's-road, Stoke Newington, he did unlawfully begin to erect a certain building beyond the general line of buildings without the consent of the London County Council, contrary to Section 75 of 25 and 26 Victoria, cap. 102; Section 10 of 45 and 46 Victoria, cap. 15; and 51 and 52 Victoria, cap. 41. The facts were these. On October 20, 1894, the respondent, a builder, began to erect in Prince George's-road for Mr. Hicklin, the owner of the site, a certain building. The Superintending Architect to the London County Council by his certificate of January 22, 1895, decided the general line of buildings in Prince George's-road, and decided that the said building was in the said road. Mr. Hicklin appealed to the Tribunal of Appeal constituted under Section 28 of the London County Council (General Powers) Act, 1890, and Section 175 of the London Building Act, 1894; but the respondent was not a party to that appeal. The result of that appeal was that the certificate of the architect, so far as it related to the general line of buildings on the northern side of Prince George's-road was confirmed, but determined that the house in question was on land within the exceptions contained in the Act of 1890, such land being the sites of buildings, and land held with buildings, existing at the time of the passing of the Act. Prince George's-road runs at right angles to Stoke Newington-road. Previous to 1890, when Prince George's-road was laid out and made, there had been a row of houses, Nos. 69-85, Stoke Newington-road, having forecourts in front between them, and the Stoke Newington-road and gardens at the back. In order to make a space for Prince George's-road, No. 81, Stoke Newington-road was pulled down. Nos. 83 and 85, Stoke Newington-road remained standing at the time the magistrate heard the summons. The forecourts to them were about 40 ft. in length. The building in question when finished will be situated on part of the forecourt of No. 83, and upon the whole forecourt of No. 85, and upon part of the gardens of Nos. 83 and 85. It appeared that the part which would be on the site of the old house itself was not the subject of the summons. The said building begun to be erected by the respondent was 7 ft. beyond the general line of buildings in Prince George's-road. No consent was given by the County Council to the erection of the said building. It was contended on the part of the respondent (1) that inasmuch as the decision of the Tribunal of Appeal had determined that the said building was being erected on land within the exceptions of Section 33 of the London County Council (General Powers) Act of 1890, the architect had no power to decide the general line of buildings under Section 75 of the Metropolis Management Act of 1862; (2) that the said building was exempt from the requirements of Section 75 by reason of the facts being indistinguishable from those in the case of Lord Auckland *v.* the Westminster District Board. The appellants, in answer to the first point, contended that the Tribunal of Appeal on this appeal, which was under Section 28 of the Act of 1890, could not include in their decision a finding such as that set out. They relied on Nixey *v.* the London County Council. They also contended, in reply to the second point, that the principle of Lord Auckland's case did not apply. The magistrate decided against the first contention of the respondent, but being of opinion that the facts stated were indistinguishable from those of Lord Auckland's case, he dismissed the summons. The material portions of the important sections are as follows (25 and 26 Victoria, cap. 102, the Metropolis Local Management Act, Section 74):—"In case any building . . . which shall in any part project beyond the general line of the street in which the same may be situate . . . shall at any time be taken down . . . it shall be lawful for the Metropolitan Board of Works to require the same to be set back . . . as the said Board shall direct, provided that the said Board shall make compensation to the owner." Section 75 provides that "no building, structure, or erection shall, without the consent in writing of the Metropolitan Board of Works, be erected beyond the general line of buildings in any street, place, or row of houses in which the same is situate, in case the distance of such line of buildings from the highway does not exceed 50 ft. . . . such general line of buildings to be decided by the superintending architect. . . ." It further provides that "in case any building be erected without such consent the complaint may be made to a Justice, who can direct the demolition of so much of the building as projects beyond the line." The London County Council have succeeded to the powers of the Metropolitan Board of Works.

On behalf of the County Council it was contended that, though a man might build a house on the site of an old building, yet that he could not build upon ground which was formerly a garden or forecourt. In Lord Auckland's case it was decided that a certain yard was in reality part of the site of the old house. Another contention was that Prince George's-street being a new street, there could have been no old site existing in that street. The old houses were in Stoke Newington-road. These cases were cited:—Barlow *v.* Kensington Vestry; Worley *v.* Vestry of St. Mary Abbotts.

On behalf of the respondent it was argued that it was a question of fact, and the magistrate had found in the respondent's favour that the facts brought the case within the authority of Lord Auckland *v.* Westminster Local Board. Section 75 did not apply to ground that had formerly been covered with buildings unless the owner had relinquished his right of building. In fact there were some buildings at the back of the house, though they were not mentioned in the case.

Mr. Justice Lawrence, in giving judgment, said that the question was whether the magistrate was right in holding that the facts in this case came within the decision of Lord Auckland's case. In the opinion of the learned Judge it did not. The facts there were that there was a courtyard, probably only a small portion of the general building, with a high wall round. This yard was held to be part of the premises on which Lord Auckland might rebuild. In the case before them there was a forecourt and garden to Nos. 83 and 85, and the owner claimed the right to build on them. It could not be done, however, if the building was in front of the building line. He was desirous of building on the 40 ft. of forecourt and on the garden at the back, which was perhaps double the length. All the cases showed that this could not be done. The appeal must be allowed.

Mr. Justice Collins said that he had some doubts at first as to whether the magistrate had not found as a fact that the facts of the case brought it within Lord Auckland *v.* the Westminster District Board, but on looking at the structure of the case, it appeared that the magistrates had stated the facts and asked the Court as a question of law whether they were governed by Lord Auckland's case. There land, part of the purtenance of a house pulled down, was held to come under the word "building," so as to entitle the owner to say that he could build thereon. It formed part of the house. There were similar cases, however, in which the facts were found the other way. In the case of Lavy *v.* London County Council (1895) there was a house and garden with a dwarf wall round. The owner built a large wall 11 ft. high and 18 in. thick on the site of the old wall. According to the respondent's arguments in this case, he would have been entitled to erect a house there. But it was held that he had no right to build such a structure as he put up. So far as a principle was to be gathered from the cases, it did not go beyond this, that a man was entitled to build a series of structures on the same site. But where there was a large area not built on, as here, when the forecourt was 40 ft. in length, and the garden at the back longer, it must be taken as a point of law that they could not be part of the building. The Magistrate had given the plans and dimensions, and asked the Court whether the building in this case was within the principle of Lord Auckland's case. The case must be sent back to him to be dealt with.

Leave to appeal was granted.

Mr. Horace Avory and Mr. Daldy appeared for the London County Council (the appellants), and Mr. McCall, Q.C., and Mr. Macmorran, Q.C., for the respondent.

THE PUBLIC HEALTH ACT.

AT the Lambeth Police-court on the 11th inst., Mr. Hopkins had before him eight summonses taken out under the provisions of the Public Health Act by the Newington Vestry against Messrs. Frederick Sutton and John Dudley, of New Kent-road, in respect of sanitary repairs alleged to be required at houses belonging to them.

Mr. Long, Chief Sanitary Inspector to the Vestry, said the defendants were the owners of several hundred houses in the parish, and the Vestry were constantly serving them with notices, but nothing whatever was done by the defendants until they were summoned, and when the summonses were about to be heard the defendants asked for an adjournment to enable them to do the work. Now the Vestry asked the Court to assist them by imposing penalties.

The defendants' manager said they were spending 500*l.* a year in sanitary work, but they could not do the work fast enough to satisfy the Vestry.

Mr. Hopkins suggested that greater progress might be made by employing more men.

Mr. Long said he was told the defendants had only three men at work.

Mr. Hopkins fined the defendants 20s. and costs upon each summons.

CASE UNDER THE NEW BUILDING ACT.

A CASE under the new Building Act came before Mr. Lushington at Bow-street Police-court on the 27th ult., the London County Council being the complainants, and Messrs. Gorrill, builders, Peacock-street Works, Newington Butts, the defendants.

Mr. Thomas Chilvers represented the County Council, and Mr. Charles Lloyd appeared for the defendants.

Mr. Chilvers explained that the proceedings were taken under the London Building Act of 1894, and the defendants were summoned for erecting a building beyond the general line of buildings on the western side of Lincoln's Inn Fields. No. 50, Lincoln's Inn Fields was formerly fronted by a forecourt 45 ft. long by 28 ft. wide, with vaults extending under a portion of it. Early in 1895 the defendants demolished the old building and erected a new one in its place. In addition to doing this, they excavated the vaults in the forecourt, and erected on the site four offices above the level of the adjoining pavement. The roof was of concrete and iron, with skylights above. In the opinion of the Council, this was a building within Section 22 of the Act, and should not have been erected without their sanction. Mr. Chilvers cited several cases in support of the prosecution, and called Mr. Barry, Surveyor to the County Council, and Mr. Forster Hayward, District Surveyor of St. Giles's District.

Mr. Lloyd, for the defence, contended that the vaults extended over the whole of the forecourt, and were buildings or structures within the meaning of the Act.

Mr. Robert J. Worley, architect, gave evidence in support of that view.

The foreman of the works at 50, Lincoln's Inn Fields, stated that vaults extended over the whole of the forecourt. One of them had been bricked up. It was filled with bricks and bottles.

Mr. Chilvers pointed out that if Mr. Lloyd's contention was correct, that buildings could be erected on the site of every vault, a most inconvenient state of things would arise. For instance, there were vaults connected with almost every house in the Strand. Many of them went under the pavement; but surely no one could argue that they would be justified in building on the pavement.

Mr. Lushington adjourned the case, to enable him to consider the cases quoted, and on Saturday last he gave his decision, remarking that he had gone very carefully into the merits of the case. The defendants had no right to do what they had done without the consent of the County Council. The cases cited seemed to show that when a boundary wall was used for any purpose beyond that of being a mere boundary-wall, it must be considered as a building, and it was so in the present case. On the other hand, it seemed that as long as the builders kept below the surface of the ground they might build as much as they pleased without affecting the original line of building. As this building had been erected without the consent of the London County Council the defendants had committed an offence under the Act, and would be convicted accordingly.

On the application of Mr. Chilvers, Mr. Lushington ordered the defendants to pay 5*l.* 5s. costs.

Mr. Lloyd remarked that no order had been made as to what the defendants were to do. Would it satisfy the Council if they reduced the forecourt to the old level, and took out the skylights?

Mr. Chilvers said he had no doubt the Council would be ready to consider any reasonable proposals made by the defendants.

CASE UNDER THE NEW BUILDING ACT.

AT the Lambeth Police Court on the 4th inst. Mr. Hopkins had before him the case of Dunsmore *v.* Marsland, which was an appeal by Mr. Gilbert Dunsmore, a Peckham builder, against a notice of requirements served upon him by Mr. Ellis Marsland, District Surveyor for Camberwell, in connexion with the contemplated erection of some houses at Peckham Rye. The point at issue was whether the District Surveyor was entitled to demand that the buildings should be erected in accordance with the provisions of the London Building Act, 1894, or whether the builder was entitled to proceed under the old Act.

Mr. Rose-Innes appeared in support of the appeal, and Mr. Williams represented the District Surveyor.

Mr. Innes said the parties were desirous of deciding what was the proper construction to be put upon Section 212 of the London Building Act. Mr. Dunsmore was a gentleman who was carrying on building operations, and prior to the Act coming into force, Messrs. Stevens, who were the owners of considerable property at Peckham Rye, had agreed to let him for a period of something like ninety-nine years, at a rental of 50*l.* per annum, some land upon which he had now built a number of houses, and upon which he was desirous of building four more. The difficulty raised by the District Surveyor was that there was no written contract between Messrs. Stevens and Mr. Dunsmore so as to bring the case within the decision in "Tanner and Oldham," which was reported in the January number of the Law Reports. His (Mr. Innes') view was that it was perfectly immaterial whether the contract was in writing or not.

Mr. Williams, on behalf of the District Surveyor, submitted that when the Act spoke of a contract it meant a valid contract which could be enforced between the parties. Under the statute of frauds, a contract for the lease of land must be in writing. He contended that the arrangement between the parties was not a contract, because neither party could enforce specific performance.

Mr. Hopkins came to the conclusion that the houses were being erected under a contract made prior to the passing of the Act, and made an order discharging the District Surveyor's order.

MEETINGS.

FRIDAY, FEBRUARY 14.

Institution of Civil Engineers (*Students' Meeting*).—Mr. Sydney Thow on "The Construction of the Molong to Forbes Railway, New South Wales." 8 p.m.

Institution of Junior Engineers.—Mr. F. J. Bancroft, B.Sc., on "The Stability of Tall Chimneys." 8 p.m.

York Architectural Society.—Mr. A. H. Claypoole on "The Ventilation of Buildings."

SATURDAY, FEBRUARY 15.

Edinburgh Architectural Association.—Visit to (1) Electric Lighting Station, Dewar-place; (2) 11, Drumsheugh-gardens; (3) 28, Drumsheugh-gardens.

MONDAY, FEBRUARY 17.

Royal Institute of British Architects.—Mr. R. Phené Spiers, F.S.A., on "Saint-Front of Perigueux, and the Domed Churches of Perigord and La Charente." 8 p.m.

Royal Academy of Arts.—Lectures on Architecture, by Professor Aitchison, A.R.A.—"Romanesque Architecture." IV. 8 p.m.

Royal Academy of Arts.—Lectures on Sculpture, by Dr. A. S. Murray.—"The Representation of Deities." I. 4 p.m.

Surveyors' Institution.—Mr. A. A. Hudson on "Conditions of Building Contracts." 8 p.m.

Society for the Promotion of Hellenic Studies.—Mr. Edmund Oldfield, F.S.A., on "The Mausoleum at Halicarnassus." 5 p.m.

Society of Arts (*Cantor Lectures*).—Professor J. M. Thompson on "The Chemistry of Certain Metals and their Compounds used in Buildings, and the Changes Produced in them by Air, Moisture, and Noxious Gases, &c." I. 8 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Introductory Lecture, by Professor A. Wynter Blyth. 8 p.m.

TUESDAY, FEBRUARY 18.

Institution of Civil Engineers.—Paper to be further discussed:—"The Manufacture of Aluminium by Electrolysis; and the Plant at Niagara for its Extraction," by Mr. Alfred Ephraim Hunt. 8 p.m.

Society of Arts (*Foreign and Colonial Section*).—Mr. H. F. Parshall on "The Development of Electrical Traction Apparatus." 8 p.m.

London School of Economics and Political Science (9, John-street, Adelphi).—Mr. E. J. Harper on "The Rating Question." II. 6.45 p.m.

Glasgow Architectural Association. — Mr. T. L. Watson on "Glasgow Cathedral: A Contribution to the History of the Structure." 8 p.m.

WEDNESDAY, FEBRUARY 19.

Architectural Association (*Discussion Section*).—Mr. H. R. Appelbee on "Conditions of Architectural Competitions." 7 p.m.

British Archæological Association.—Mr. Walter Money, F.S.A., on "The Parish Registers of Newbury." 8 p.m.

Society of Arts.—Mr. H. Macan on the "Report of the Royal Commission on Secondary Education." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Liverpool Engineering Society. — Mr. Alexander Ross on "Light Railways." 8 p.m.

THURSDAY, FEBRUARY 20.

Royal Academy of Arts.—Lectures on Architecture, by Professor Aitchison, A.R.A.—"Romanesque Architecture." V. 8 p.m.

Society of Antiquaries. 8.30 p.m.

Society for the Encouragement of the Fine Arts.—Mr. F. H. Evans on "Lincoln Cathedral." 8 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Dr. H. Manley on "Sanitary Law—English, Scotch, and Irish; General Enactments Public Health Act, 1875; Model By-laws, &c." 8 p.m.

FRIDAY, FEBRUARY 21.

Architectural Association.—Mr. Arthur Silver on "The Modern Stencil." 7.30 p.m.

Royal Academy of Arts.—Lectures on Sculpture, by Dr. A. S. Murray: "The Representation of Deities." II. 4 p.m.

Incorporated Association of Municipal and County Engineers.—Metropolitan District Meeting.—(1) Mr. J. Patten Barber on "Some suggested Amendments of the Metropolis Local Management Acts"; (2) Mr. W. Nisbet Blair on "The Wear of Hardwood Paving and the Weight of Traffic thereon." 7.30 p.m.

SATURDAY, FEBRUARY 22.

Sanitary Institute (*Lectures for Sanitary Officers*).—Inspection and Demonstration at Aylesbury Dairy Company's Premises, Bayswater. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

3,868.—DRAIN TEST: *W. Standing.*—A plug or stopper for use in testing drains and other pipes. Consists of a solid central portion or base, having a groove or channel round its periphery for the reception of a hollow tube of rubber or similar material. The tube, when inflated with air, may be made to exert a considerable pressure upon the inner surface of the pipe.

4,781.—WINDOWS: *J. Welby.*—An improved method of balancing window-sashes. Is also applicable to dinner-lifts, and the like. A rack is fixed to the movable sash, and gears with a pinion, turning on a fixed axis, on the opposite side of which is a weight having a serrated edge, which also gears with the toothed pinion. The whole is so arranged that the weight moves downwards when the sash is raised and *vice versa*.

5,088.—VENTILATOR: *H. Bagshaw.*—A metal plate roof ventilator is formed with the body consisting of four or more vertical tubes, each having a longitudinal opening towards the centre of the arrangement, and a concentric deflecting plate fixed opposite each of the openings, leaving a suitable space for the exit of vitiated air. The openings through which the air escapes, being directed towards the centre of the ventilator, are away from the action of wind and rain.

5,171.—WATER-CLOSETS: *T. Twyford.*—In this invention the traps of water-closets are twisted, in making, to such a shape that the outlet passage is disposed laterally or at right-angles to the longer direction of the pan. The ordinary board seat is dispensed with, the sides of the earthenware rim being provided with wood insertions or strips. The basins are made with a cavity or recess at the back.

5,218.—FANLIGHTS, &c.: *T. Pickup.*—A device for opening and closing fan or swivel lights. Is formed of a slotted link hinged to the sash, the slot engaging a projecting pin or stud secured to the window-frame. A cord is fastened at one end to the free end of the slotted link, and at the other passing round a pulley on the sash and attached to a fixed point, by which means the window is held in an open or closed position.

22,064.—CISTERNS: *H. Alexander.*—A combined bank and reservoir for storing water and protecting same from atmospheric pollution. A reservoir is constructed of iron or steel plates of any convenient shape, and having a bottom which slopes downward towards the centre, where a boss and outflow-pipe are situated. The top of the reservoir has a contracted opening, over which an air-box, having three valves, is fixed. One of said valves is for the admission of water, and the other two are air-valves, serving also as warning-pipes in the event of leakage. A warning-valve is also arranged to hang from a float in the air-box and fall into a seating round the outflow of the reservoir, if the supply from the main ceases. In this case the reservoir is tapped by a supplementary outflow-pipe and cock.

NEW APPLICATIONS FOR LETTERS PATENT.

JANUARY 27.—1,853, F. and R. Averill, Latches, Hooks, and similar Fastenings for Doors, Gates, and Casements. —1,882, J. Innocent, Edge-tools.—1,895, A. Stevenson, Ventilators.—1,923, H. Thomson, Syphon Cisterns for Flushing Water-closets, &c.

JANUARY 28.—1,973, T. Tubbs, Plane-iron for Woodworking Planes with removable Cutters.—1,990, H. Hutchinson and J. Green, Sliding Windows.—1,997, A. Kunowsky, Centre-bits and similar Tools.—2,015, S. Hellyer, Water-closets, Slop-sinks, &c. — 2,046, S. Bridgwood & Son, Kilns.

JANUARY 29.—2,050, T. Evans, Water Waste-preventers. —2,108, J. Neave, Manholes of House or Sewer-drains.—2,109, G. Inman, Fastening Doors, Windows, &c.—2,110, J. Coffin, Door-springs.

JANUARY 30.—2,155, J. Shanks, Lavatories.—2,157, W. Thomson, Window-sashes.—2,173, Ames, Crosta, & Co., Limited, and R. Ames, Drain, Sewer-pipes, &c.—2,202, J. Berry and others, Brickmaking and similar Presses.—2,219, C. Sullivan, Paint.—2,223, F. Turner, Cement or Artificial Stone.

JANUARY 31.—2,240, H. Denton and J. Cartwright, Gate and Door-stops.—2,251, C. Gray and H. Wilson, Fanlight and Skylight-openers.

FEBRUARY 1.—2,310, J. Phillips and F. Howard, Connecting Pipes to Pipes, &c.—2,321, W. Johnson, Driving Arrangement of combined Brickmaking and Pressing Machines. — 2,322, B. Waldron, Venetian or Louvre Ventilators.

PROVISIONAL SPECIFICATIONS ACCEPTED.

107, E. Margrett, Grease-trap.—254, W. Aston, Door Furniture.—385, C. Adamv and R. Tansk, Hinges.—620, J. Marsland, Automatic Flushing-cisterns.—768, A. Green, Door-handles, &c.—881, T. Buck, Cutting Clay or like material into Bricks or Blocks.—935, A. Pullan, Moulding and Pressing Bricks.—1,001, G. Grundy, Decorating Tiles, &c.—1,072, D. Rees, Ventilating Apparatus.—1,155, T. Ford, Chandeliers, &c.—1,196, J. Whitfield, Hinges.—1,220, T. Willard, Roofs of Buildings.—1,248, L. Aston, Window-sashes.—1,265, E. Jackson, Power Mortising and Boring Machines.—1,408, G. Falconar, Blocks or Slabs for use for Flooring, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

6,437, W. Scott-Moncrieff, Flushing Apparatus.—17,421, H. Lake, Heating Buildings, &c.—22,309, G. Kleine and W. Falkenroth, Cutting Tools for Wood Screws.—24,256, C. Wagner, Chimneys, and in Bricks or Blocks therefor.—25,018, W. Thompson, Dovetail Mortising Machines.—25,037, M. Campbell, Stone Planer.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

Jan. 23.—By G. J. ROBINSON (at Northallerton).

Northallerton, Yorks.—Two enclosures of land, 26 a. 2 r. 38 p., f. 1,985

By W. N. WILLOUGHBY.

Norwood.—2, Chatsworth-rd., u.t. 80¾ yrs., g.r. 13*l.* 10s., r. 75*l.* 850

By W. WILSON.

Pimlico.—44, Lillington-st., u.t. 29 yrs., g.r. 5*l.* 13s. 6d. r. 52*l.* 285

By C. C. & T. MOORE.

Walthamstow.—4, 6, 8, and 10, Eldon-rd., f., r. 101*l.* 4s. 1,415

12, Erskine-rd., f., e.r. 55*l.* 670

Erskine-rd., a plot of building land, f. 120

Westbury-rd., "Westbury House," f., r. 32*l.* ... 345

Victoria-pk.—28, Sewardstone-rd., u.t. 62 yrs., g.r. 5*l.*, r. 33*l.* 280

Dalston.—13, 14, and 15, Regent's-row, u.t. 48 yrs., g.r. 9*l.*, r. 132*l.* 12s. 720

78 and 80, Brougham-rd., u.t. 50 yrs., g.r. 7*l.*, r. 61*l.* 14s. 520

Holloway.—1, Brook-rd., u.t. 67½ yrs., g.r. 6*l.* 10s., r. 26*l.* 200

By STIMSON & SONS.

Hyde Park.—27 and 28, Cambridge-ter., u.t. 34½ g.r. 24*l.*, r. 195*l.* 2,030

Lambeth.—12 and 13, Addington-st. and two blocks of buildings adjoining, u.t. 25¾ yrs., g.r. 52*l.* 10s., r. 190*l.* 1,250

Peckham.—240 and 244, Albert-rd., u.t. 71 yrs., g.r. 9*l.*, r. 52*l.* 4s. 435

3, 5 and 7, Ady's-rd., u.t. 79½ yrs., g.r. 16*l.* 10s., r. 82*l.* 750

Bermondsey.—37 and 39, Camilla-rd., u.t. 38½ yrs., g.r. 8*l.* 420

Jan. 24.—By E. H. HENRY.

Battersea.—10, Sugden-rd., u.t., 80 yrs., g.r. 6*l.* 5s., r. 40*l.* 410

By WAGSTAFF & WARMAN.

Bishopsgate-street Without.—No. 105, f., r. 125*l.* 1,990

Jan. 27.—By JENKINS & SONS (at Deptford).

Brockley.—48, Sandbourne-rd., u.t. 79 yrs., g.r. 7*l.* 350

Deptford.—27 and 29, Octavius-st., u.t. 66 yrs., g.r. 4*l.* 345

Lewisham.—18, Ladywell-rd., u.t. 66½ yrs., g.r. 6*l.* 225

Jan. 28.—By MACKINDER, PARISH, & BEATY (at Alford).

Sloothby, Lincs.—Two closes of land, 11 a. 3 r. 37 p., f. 430

By ROGERS, CHAPMAN, & THOMAS.

Kensington.—89, Cornwall-gardens and 8, Cornwall-mews South, u.t. 65¾ yrs., g.r. 54*l.* 2,200

Shepherd's Bush.—74 and 76, Minford-gardens, f., r. 70*l.* 990

By P. & G. GEEN.

Anerley.—Elmer's End-rd., &c., eleven plots of building land, f. 500

Norwood.—29, 35, and 37, Penge-rd., u.t. 71 yrs., g.r. 25*l.*, r. 100*l.* 435

24, Beverley-rd., u.t. 69 yrs., g.r. 10*l.*, r. 38*l.* 240

By E. SIMPSON.

New Cross.—63 and 64, Somerville-rd., u.t. 53¾ yrs., g.r. 7*l.*, r. 51*l.* 440

71 and 73, Watson-st., f., r. 35*l.* 2s. 405

12, Nettleton-rd., u.t. 49½ yrs., g.r. 4*l.* 10s., r. 32*l.* 315

Lewisham.—9, Wickham-rd., u.t. 63½ yrs., g.r. 7*l.* r. 48*l.* 500

By W. G. SHADRAKE (at Stratford).

Leyton.—129, High-rd., u.t. 83 yrs., g.r. 5*l.* 260

Jan. 29.—By MULLETT, BOOKER, & CO.

Denston, &c., Suffolk.—"The Denston Hall Estate," 2,167 a. 0 r. 28 p., f. 22,500

By JONES, SON, & DAY.

Bethnal Green.—21 and 22, Hersee-pl., f., r. 46*l.* 16s. 520

Poplar.—1, 2, and 3, Harrow-lane, f., r. 56*l.* 4s. ... 560

By R. TIDEY & SON.

De Beauvoir Town.—68, Ufton-rd., u.t. 25 yrs., g.r. 2*l.* 10s., r. 35*l.* 250

By POWELL & POWELL (at Weston).

Weston, Somerset.—A freehold farmhouse and 4 a. 1 r. 8 p. 965

By J. W. BRIGGS (at Over Whitacre).

Over Whitacre, Warwickshire.—Three closes of land, 16 a. 1 r. 34 p., f. 900

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*New Church	St. Thomas Church Committee	100*l.* and three at 25*l.* each	June 1
Workhouse, Infirmary, &c.	Nottingham Union	210*l.* 105*l.* 52*l.* 10*s.*	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Schools, Cottage Homes, Shenley Fields, near Birmingham	King's Norton Union	Edwin Docker, Cottage Homes, Northfield, Birmingham	Feb. 18
*Works and Materials	Tottenham U.D.C.	P. E. Murphy, Council Offices	do.
*Disinfector House at Sewage Works	do.	do.	do.
*Hard York Paving	do.	do.	do.
Drainage Works, Waverley Abbey, near Farnham	Mrs. Anderson	Peak & Lunn, Surv. 36, High-street, Guildford	do.
Flagging, Channelling, &c.	Birkenhead Corp.	C. Brownridge, Engr. Town Hall, Birkenhead	Feb. 19
Road and Street Works	Blackpool Corp.	J. Wolstenholme, Borough Surv. Market-street	do.
Pipe Sewer, Tennant-st.	Leith (N.B.) T.C.	Borough Surveyor	do.
Bridge, Trebarwith, Tintagel, Cornwall		Silvanus Trevail, Archt. Truro	do.
Sewering, Bancroft-lane	Mansfield (Notts) Corp.	R. F. Vallance, Surveyor, Mansfield	Feb. 20
Sewerage Works	Ripon Corp.	Preston & Johnson, Archts. 14, The Exchange, Bradford	do.
Mission Church, Hunslet, Leeds	Rev. Canon Thompson	J. E. Leak, Archt. Hunslet, Leeds	do.
Additions, &c. St. John's House	Ipswich Union	H. J. Wright, Archt. 4, Museum-st. Ipswich	do.
Six Houses, College-road, Cork	D. J. Hegarty	J. F. M'Mullen, Archt. 30, South Mall, Cork	do.
*Extension of Stores, Derby	M. R. Co.	Co.'s Archt. Cavendish House, Derby	do.
Road Works, Chesterfield-road	Mansfield (Notts) Corp.	R. F. Vallance, Borough Surveyor	do.
*Alterations, Northern Fever Hospital	Met. Asylums Board.	Pennington & Son, Hastings House, Norfolk-st. W.C.	Feb. 21
*Construction of Roadway, &c. Broken Granite, Setts, &c.	do.	do.	do.
*Making-up Road	Burton-on-Trent T.C.	Borough Surveyor	do.
*Roman Catholic Chapel	Finchley U.D.C	Council Offices	Feb. 24
*Works and Materials	St. Pancras Vestry Burial Board	Segrave, Browett, & Taylor, 116 & 117, Holborn, W.C.	do.
Alterations, &c. to Destructor Buildings	Hendon U.D.C.	S. S. Grimley, Public Offices	do.
Two Cottages, Torr Vale-road, Newtown, near Stockport	Bury (Lancs) Corp.	J. Cartwright, Boro' Engr.	do.
Shelter on Foreshore	New Mills Co-op. Soc.	Peter Wain, Secy. Co-op. Soc. New Mills, near Stockport	do.
Chapel and School, Stokenchurch, Oxon	Filey (Yorks) U.D.C.	R. M. Robson, Archt. 21, Belle Vue-street, Filey	do.
*Sewer Work	Holborn Bd. of Wks.	S. Barney, Archt. Wycombe road, Stokenchurch	do.
*Stoneware, &c. Sewers and Manholes School, Queen-street, Fenton	Bournemouth T. C.	L. H. Isaacs, C.E. 3, Verulam-bldgs, Gray's Inn	do.
*Construction of Engine House	Stoke-on-Trent Sch. B.	Borough Surveyor	Feb. 25
*Supplies	Shoeburyness U.D.C.	Scrivener & Sons, Archt. Howard-place, Hanley	do.
*Australian Hard Wood Pavement	West Ham Council	J. Mansergh, 5, Victoria-street, S.W.	do.
	Streets Committee Commrs. of Sewers	Borough Engineer, Town Hall, Stratford	do.
		The Engineer, Guildhall	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
*Completion of Waterworks	Barmouth U.D.C.	T. Blackburn, C.E. Barmouth	Feb. 25
Police Station, Dalton-in-Furness		J. W. Grundy & Son, Archt. Ulverston	Feb. 26
*Making-up Road and Pipe Sewers	Walthamstow U.D.C.	G. W. Holmes, Town Hall	Feb. 28
Road Materials, Market Harborough	Oxendon R.D.C.	C. Burgoine, Clerk, Council Offices, Market Harboro'	do.
*Granite and Slag	Spilsby R.D.C.	Council Offices	Feb. 29
*Services and Materials	St. Mary Magdalen, Bermondsey Vestry	Vestry Clerk, Town Hall	do.
Granite Road Metal, &c. Boston, Lincs.	Holland C.C.	H. C. Johnson, Sessions House, Boston	do.
*Waterworks	Mountmellick Union	T. & H. Turpin, Maryborough, Queen's County	do.
*Works and Materials	St. Pancras Vestry	W. N. Blair, Vestry Hall	Mar. 2
*Works and Materials	St. Mary Abbotts, Kensington Vestry	Town Hall, High-street, Kensington	Mar. 3
Hotel, Newcastle, Co. Down	Belfast and Co. Down Ry. Co.	Young & Mackenzie, Architects, Belfast	do.
*Works and Materials	Lambeth Vestry	J. P. Norrington, Vestry Hall	do.
*Sewerage Works	Disley R.D.C.	H. Bancroft, 88, Masley-street, Manchester	do.
Brick, &c. Sewers	Ayr Commissioners	J. Eaglesham, Engr. Town Chambers, Ayr	Mar. 4
Pipe Sewers	Rotherham R.D.C.	W. Spinks, C.E. 37, Prudential-buildings, Leeds	Mar. 6
Weaving Shed, &c. West Vale Mills Halifax		C. F. L. Horsfall & Son, Archts. Lord-st. Chambers, Halifax	Mar. 7
*Private Street Works	Stoke Newington Ves.	S. E. Burgess, Vestry Hall	do.
*Works and Materials	Lewisham Bd. of W.	Board of Works Offices, Catford, S.E.	Mar. 10
Asylum, Portrane, Co. Dublin	Lunacy Commissioners (Ireland)	G. C. Ashlin, Archt. 7, Dawson-street, Dublin	Mar. 13
Engine House, &c.	Gloucester Corporation	Wm. Fox, C.E. 5, Victoria-street, Westminster	Mar. 19
*Engine House, &c. &c. for Waterworks	Gloucester Corp.	W. Fox, 5, Victoria-street, Westminster, S.W.	do.
*Construction of New Museum for Egyptian Antiquities	Egyptian Government	Offices of the "Service Administratif"	April 18
*Construction of Arabic Museum and Khedivial Library, Cairo	Egyptian Government	Offices of the "Service Administratif"	May 2
Stables, Coach House, &c. Oak Bank, Rawtenstall, Lancs.	R. Whitaker	Chas. Parsons, Archt. 9, Grimshaw-st. Burnley	No date
Extension of Carpet Factory, Kidderminster	J. Humphries & Sons, Lim.	J. M. Gething, Archt. Oxford-st Kidderminster	do.
*Dwelling Houses		W. M. Gilbert, 12, Havelock-road, Hastings	do.
Additions, &c. Manor House, Heath, Wakefield		Simpson & Richardson, Archts. Southgate-chambers, Wakefield	do.
Ten Houses, Camp-road, Leeds		Mr. Morley, Wormald-row, Leeds	do.
Church Restoration, Nelson, Lancs.		Smith Whitehead, Archt, Nelson	do.
Additions to Chapel, Chapel-street, Blackpool		J. B. Thornley, Archt. Waterloo - road, South Shore, Blackpool	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Clerk of Works	Leeds General Infirmy.	3*l.* 3*s.*	Feb. 20
*Sanitary Inspector	Plumstead Vestry	Commence 104*l.*	Feb. 21
*Surveyor and Inspector of Nuisances	Berkhampsted R.D.C.	90*l.* per annum	Feb. 22
*General Road Foreman	Cambridge Corp.	2*l.* per week increase of 5*s.* in twelve months	do.
*Buildings Inspector	Wimbledon U.D.C.	3*l.* per week	Feb. 24

Those marked with an asterisk (*) are advertised in this Number. *Competition, p.* iv. *Contracts, pp.* iv., vi., viii., *&* x. *Public Appointments, pp.* xviii., xix, *&* xxi.

By FURLONG & SON (at Woolwich).

Plumstead, Kent.—100, 102, 104, and 106, Robert-st., f. 1,395
Eltham, Kent.—85, High-st., f., r. 15*l.* 12*s.* 230

JAN. 30.—By J. BOTT.

Herne Hill.—2, Norwood-rd., u.t. 83½ yrs., g.r. 10*l.*, e.r. 55*l.* 450

By DONÉ & FROST.

Clapton.—46, Lower Clapton-rd., u.t. 61 yrs., g.r. 8*l.* 3*s.*, r. 75*l.* 960
4, Donegal Pl., f., r. 85*l.* 1,410
Addiscombe.—119, Addiscombe-rd, f., r. 60*l.* 1,020

By NEWBON & Co.

Canonbury.—65, Leconfield-rd., u.t. 53¾ yrs., g.r. 4*l.*, r. 36*l.* 385
Islington.—43, 45, and 47, Queensberry-st., u.t. 14½ yrs., g.r. 11*l.* 5*s.* 305
St. Pancras.—7, Woburn Bldgs., u.t. 25½ yrs., g.r. 10*l.*, r. 48*l.* 245
15 and 15a, Woburn Bldgs., u.t. 22½ yrs., g.r. 15*l.* 305
Peckham.—56 to 70 (even), Pennethorne-rd., u.t. 86 yrs., g.r. 16*l.* 2,000
66a, Clayton-rd., u.t. 79 yrs., g.r. 5*l.* 5*s.*, r. 36*l.* 305
Hatcham.—10 to 16 (even), and 24 and 26, Upcott-st., u.t. 65 yrs., g.r. 28*l.* 10*s.* 1,000
2, 4, and 22, Blockhouse-st., u.t. 65 yrs, g.r. 14*l.* 5*s.* 530
19 and 21, Sharratt-st., u.t. 67 yrs., g.r. 8*l.* 325
Dulwich.—54, Dunstans-rd., u.t. 91 yrs., g.r. 5*l.* 270
Tooting.—51 to 57 (odd) and 70 and 72, Graveney-rd., u.t. 82¾ yrs., g.r. 28*l.* 600
Clapton.—11 to 17 (odd), Oswald-st., u.t. 82 yrs., g.r. 20*l.* 500
Leyton.—46, 48, 50, and 52, Colville-rd., u.t. 83 yrs., g.r. 16*l.* 700
129, 131, 133, and 135, Grove Green-rd., u.t. 80 yrs, g.r. 20*l.* 650
Forest Gate.—21, 23, 25, and 27, Glenparke-rd., u.t. 91 yrs., g.r. 21*l.* 875
29 and 31, Glenparke-rd., u.t. 91 yrs., g.r. 10*l.* 10*s.* 450
Canning Town.—4, 6, 8, and 10, Clifton-rd, u.t. 90 yrs, g.r. 16*l.* 16*s.* 510

By HOOKER & WEBB (at Croydon).

Croydon.—2 and 2A, Pitlake, f. 940
Stretton-road, a residence, u.t. 97¼ yrs., g.r. 5*l.* 10*s.* 490

By TERSON & SON (at Dover).

Hougham, Kent.—"Church Farm," 66 a. 3 r. 0 p., f. 1,100
Two enclosures of land and six cottages, 5 a. 0 r. 22 p., f. 219

By J. A. EGGAR (at Farnham).

Crondall, Hants.—"Thorns Farm," 60 a. 3r. 2 p., c. 370

By BUCKLAND & SONS (at Kingston).

Norbiton, Surrey.—Wolverton-av., &c., sixteen plots of land, f. 2,605
Kingston, Surrey.—Oil Mill-lane, f.g.r. 35*l.*, reversion in 76 yrs. 1,020

By SUDLOW HERRICK & SONS (at Kingston).

Kingston, Surrey.—Hawk's-road, freehold manufacturing premises 1,200

By PHILIP DAVIES (at Knighton).

Llanbister, &c., Radnor.—Five freehold farms, 159 a. 3 r. 0 p. 2,110

Jan. 31.—By GREEN & SON.

City of London.—32, Watling-st., u.t. 30 yrs., g.r. 125*l.*, r. 275*l.* 300

By HOLLIS & WEBB (at Leeds).

Harrogate, Yorks.—The "Prince of Wales" Hotel Estate, area 5,146 square yds., c. 10,500

Feb. 3.—By ALFRED RICHARDS.

Stepney.—65, 67, 69, and 71, Copley-st., u.t. 49½ yrs., g.r. 14*l.* 990
18 and 20, Varden st., u.t. 11 yrs., g.r. 4*l.* 160
20, Turner-st., u.t. 14 yrs., g.r. 3*l.* 120

By NOKES & NOKES.

Barnsbury.—73, Roman-rd., u.t. 65 yrs., g.r. 5*l.*, r. 50*l.* 540
Wandsworth.—Armoury Villas, f.g.r. 5*l.*, reversion in 79 yrs. 125

Feb. 4.—By DEBENHAM, TEWSON, & Co.

Maida Vale.—37, Clifton Gardens, u.t. 53 yrs., g.r. 7*l.*, r. 80*l.* 590
Kilburn.—90, Carlton Vale, u.t. 54½ yrs., g.r. 10*l.*, r. 45*l.* 326

By C. RAWLEY CROSS.

Pimlico.—5 and 12, Ranelagh-rd., u.t. 29 yrs., g.r. 15*l.*, r. 72*l.* 495

By P. HODSON.

Barnsbury.—16 and 17, Offord-st., u.t. 43 yrs., g.r. 6*l.* 355
Hammersmith.—52, Cambridge-rd., u.t. 49 yrs., g.r. nil 300
Holloway.—96 to 104 (even), Dartmouth Pk. Hill, u.t. 80 yrs., g.r. 26*l.* 5*s.* 1,055
9A, Yerbury-rd., u.t. 71 yrs., g.r. 6*l.*, r. 40*l.* 400
Finsbury Pk.—19, Endymion-rd., u.t. 81 yrs., g.r. 10*l.*, r. 57*l.* 10*s.* 585
West Smithfield.—55, St. John-st., f., r. 40*l.* 575
New Southgate.—Carlton-rd., f.g.r. 9*l.*, reversion in 83½ yrs. 245
Glenthorn-rd., f.g.r. 5*l.* 10*s.*, reversion in 84½ yrs. 140
Stamford Hill.—129, High-rd., u.t. 82 yrs., g.r. 10*l.*, r. 30*l.* 150

By J. W. MORLEY & LETTS.

Pimlico.—21, Gillingham-st., u.t. 28¼ yrs., g.r. 5*l.* r. 75*l.* 460
Woking.—St. John's "Oatlands House," f., r. 35*l.* 360

By J. C. PLATT (at Hammersmith).

Hammersmith.—39, 41 and 43, Nasmyth-st., u.t. 72½ yrs., g.r. 18*l.* 18*s.* 450
154, Hammersmith-rd., u.t. 41½ yrs, g.r. 6*l.* 16*s.* 860

Barnes.—3 and 4, Gothic Cottages, u.t. 29 yrs., g.r. 4*l.* 15*s.* 210

Feb. 5.—By M. P. HOWARD & Co.

Teddington.—Twickenham-rd., "Grove Bank," f., r. 125*l.* 1,550

By A. TURNER (at Tottenham).

Tottenham.—Greyhound-road., 11 plots of freehold land 650

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	8/0/0 0/0/0
Teak, E.I.	load	20/0/0 16/0/0
Sequoia, U.S. ft. cu		1/10 2/0
Ash, Canada load		3/5/0 4/10/0
Birch, do.		2/15/0 4/15/0
Elm, do.		4/0/0 5/5/0
Fir, Dantsic, &c.		2/0/0 3/10/0
Oak, do.		2/15/0 4/15/0
Canada		6/10/0 8/0/0
Pine, Canada red		0/0/0 0/0/0
Do. Yellow		2/15/0 5/0/0
Lath, Dantsic, fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		2/15/0 5/0/0
Odessa, crown		2/15/0 5/0/0
Deals, Finland 2nd & 1st std	100	7/0/0 8/10/0
Do. 4th & 3rd		7/0/0 8/0/0
Do. Riga		7/0/0 8/0/0
St. Petersburg, 1st yellow		9/10/0 12/0/0
Do. 2nd yellow		7/10/0 9/0/0
Do. white		8/0/0 9/10/0
Swedish		7/0/0 15/10/0
White Sea		7/15/0 14/15/0
Canada, Pine 1st		21/0/0 25/0/0
Do. do. 2nd		16/0/0 17/0/0
Do. do. 3rd, &c.		8/0/0 10/0/0
Do. Spruce, 1st		9/0/0 10/10/0
Do. do. 3rd and 2nd		6/15/0 7/10/0
New Brunswick		6/0/0 7/0/0
Battens, all kinds		5/0/0 20/0/0
Flooring boards, sq., 1 in. prep.		0/9/6 0/14/5
1st		0/6/6 0/11/6
Do. 2nd		0/6/6 0/11/6
Other qualities		0/4/6 0/7/6
Cedar, Cuba	ft.	/4 /4½
Honduras, &c.		/3½ /4½
Mahogany, Cuba		/3½ /6
St. Domingo, cargo av.		/3½ 1/0
Mexican do. do.		/4 /4½
Tobasco do. do.		/4½ /6
Honduras do.		/4½ /6
Box, Turkey	ton	4/0/0 15/0/0
Rose, Rio		7/0/0 16/0/0
Bahia		6/0/0 15/0/0
Satin, St. Domingo		0/0/5 0/2/0

TIMBER *continued*.		
Satin, Porto Rico		0/0/6 0/1/6
Walnut, Italian		0/0/3 0/0/7

METALS		
Iron—Pig, in Scotland	ton	2/7/3½ 0/0/0
Bar, Welsh, in London		5/12/6 5/15/0
Do. do. at works in Wales		5/2/6 5/5/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British cake and ingot		46/15/0 47/5/0
Best selected		48/0/0 48/5/0
Sheets, strong		54/0/0 0/0/0
Chili bars		43/12/6 43/17/6
YELLOW M'TAL	lb	0/0/4½ 0/0/4⅝
LEAD—Pig		
Spanish	ton	11/5/0 11/6/3
English com. brands		11/6/3 11,8/9
Sheet, English, 6 lbs. per sq. ft. and upwards		12/10/0 0/0/0
Pipe		12/10/0 0/0/0
ZINC—English sheet	ton	18/5/0 18/10/0
Vieille Montagne		18/15/0 0/0/0
TIN—Straits		60/10/0 61/0/0
Australian		61/5/0 61/15/0
English Ingots		64/10/0 65/0/0
Banca		61/0/0 61/5/0
Billiton		60/5/0 60/10/0

OILS.		
Linseed	ton	19/2 6 19/17,6
Cocoanut, Cochin		26/15/0 0/0/0
Do. Ceylon		22/15/0 0/0/0
Palm, Lagos		22/0/0 0/0/0
Rapeseed, English pale		25/0/0 25/10/0
Do. brown		23/15/0 24/0/0
Cottonseed ref.		17/0/0 17/5/0
Oleine		19/10/0 20/15/0
Lubricating, U.S.		6/6/0 9/6/0
Do. black		4/9/0 6/6/0
TAR—Stockholm	barrel	1/0/0 0/0/0
Archangel		0/14/6 0/15/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender: and we cannot publish lists in which the accepted Tender is below £100, unless in some exceptional cases and for special reasons.]

ABERDEEN.—For the erection of offices, &c., Old Meldrum, for Messrs. Duthie & Co. Mr. Wm. Clark, architect, Methlick, Aberdeen:—
Masonry.—Fordyce & Morrison, Vyne, Aberdeen....
Carpentry.—James Webster, Old Meldrum, Aberdeen
Slating and Plumbing.—Callander Smith, Craigdam, Old Meldrum £410

ABERDEEN. — For the execution of street-works, George-street, &c., for the Town Council. Mr. Wm. Dyack, Burgh Surveyor, Town House, Aberdeen:—
Foot-pavement in George-street.
Pringle & Slessor, 7, Thistle-lane, Aberdeen, per lin. yd., 5s. (granite kerb only).
Burnside-road (Macadamising, &c.).
John McAdam & Sons, Charlotte-street, Aberdeen, £73 12s. 6d. (slump).
Ruthrieston-terrace (Macadamising, &c.).
James Leith, 35a, Union-street, Aberdeen, £835 17s. 6d. (slump).

ALFRETON.—For the erection of house, &c., Lindway Reservoirs, Brackenfield, for the Urban District Council. Mr. E. Houfton, Surveyor, District Council Offices, Alfreton:—

R. Hopkinson	£171 9 0	G. Marple & Son	£156 10 0
J. Lamb	165 10 0	T. Andrews, Brackenfield*	129 18 6
E. Lake	163 10 0		

* Accepted.

BARNSLEY.—Accepted for the erection of six houses, Kier-street, for Mr. G. G. Alexander. Messrs. Hemsoll & Paterson, architects, 18, Norfolk-row, Sheffield. Quantities by the architects:—
Excavating, Masonry, and Bricklaying.—Schofield, Son & Hampson, Barnsley £731 0
Carpentry and Joinery.—Chandler & Bennett Corporation-street, Sheffield 240 0
Slating.—E. Fleming, Barnsley 59 0
Plastering.—E. Fleming, Barnsley 71 10
Humbing and Glazing.—Wm. Dransfield, Barnsley 28 15
Painting.—E. R. Fletcher, Barnsley 26 0
Total £1,156 5

BEN RHYDDING (Yorks.).—For the erection of a country house, for Mr. J. B. Wilson. Messrs. Fairbank & Wall, architects, 3, Manor-square, Otley. Quantities by the architects:—
Contracting.—Taylor & Ellis, Baildon £781 10
Joinery.—W. Walker & Sons, Rawdon, near Leeds 299 15
Plumbing.—R. Burley, Otley 101 11
Plastering.—A. Taylor, Eccleshill, near Bradford.. 85 10
Tiling.—J. Smithies, Bradford 89 10
Painting.—A. Marshall, Shipley 20 15
£1,378 11

BLAENAVON (Mon.).—For a shop and dwelling-house and two cottages at Pontnewynydd, for Mr. W. Cooper. Mr. E. Blewitt, architect, Pontypool:—

Davies Bros.	£540	John Morgan, Blaenavon (accepted)	£52
Morgan & Evans	527		

BOURNEMOUTH.—For the supply and delivery of 36-in. cast-iron pipes, for Alum Chine Outfall. Mr. F. W. Lacey, Borough Engineer and Surveyor:—

D. K. Stewart & Co.	£2,151 13 0	James Oakes & Co.	£1,999 7 10
Cochrane & Co.	2,149 1 9	Staveley Coal and Iron Co. (accepted)	1,960 1 3
J. & S. Roberts, Lim.	2,119 11 11	Cochrane, Grove, & Co. (informal)	
Stanton Iron Works Co.	2,062 2 8		
B. Cooke & Co.	2,000 0 0		

BOURNEMOUTH.—For laying new 36-in. outfall at Alum Chine. Mr. F. W. Lacey, Borough Engineer and Surveyor:—

B. Cooke & Co.	£3,000 0 0	W. Swales*	£2,477 17 3

* Accepted.

COMPTON GIFFORD (Devon).—For the execution of street-works, Ford Park-road, &c., for the Urban District Council. Mr. R. H. Worth, C.E., 49, George-street, Plymouth:—

	Ford Park-road West.	Gifford-terrace.	Hill Crest-lane.	Woodfordeterrace-lane.	Mannamead Avenue.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
J. Shaddock	1,561 19 2	596 18 4	47 7 6	223 9 0	369 15 6
E. Duke	1,119 0 7	419 18 2	30 14 0	141 14 0	277 15 1
Paynter & Davy	1,091 11 10	400 16 11	41 19 7	191 8 7	277 12 8
T. Shaddock	1,052 4 11	403 16 0	33 11 6	155 4 0	262 3 0*
C. L. Duke	1,065 12 6*	365 11 7*	28 17 4*	137 18 10*	268 2 11

[All of Plymouth.] * Accepted.

DOVER.—For the supply of 1,000 tons of broken granite, &c., for the Town Council:—

	Granite.	Siftings.	Kerb.	Radiated Kerb.	Channelling.	Radiated Channelling.
	Per Ton. s. d.	Per Ton. s. d.	Per Lineal Foot. s. d.	Per Lineal Foot. s. d.	Per Lineal Foot. s. d.	Per Lineal Foot. s. d.
Fry Bros.*	10 2	7 2	—	—	—	—
R. L. & J. Fennings	11 3	7 9	—	—	—	—
L. Sommerfeld	10 5	7 1	—	—	—	—
J. Mowlem & Co.	10 9	7 6	1 8½	1 10½	2 3	2 6
A. & F. Manuelle †	10 8	7 3	1 8	1 9½	2 2½	2 5½

* Accepted for Granite and Siftings. † Accepted for Granite Kerb and Channelling.

BOURNEMOUTH.—Accepted for new main sewers on the West Cliff. Mr. F. W. Lacey, Borough Engineer and Surveyor:—
B. Cooke & Co. (if lined with Cockrill-Doulton tiles in lieu of common bricks) £2,435

BRADFORD.—For the erection of four houses, &c., Westbury-street, Laisterdyke. Mr. G. C. Gamble, architect, Parkinson's Chambers, Market-street, Bradford:—
Masonry.—J. Dennison, Undercliffe, Bradford.. £487 12 11
Joinery.—R. Raper, Dudley Hill, Bradford 168 0 0
Slating.—Hill & Nelson, Bradford 34 12 4
Plumbing.—Matthew Slinger, Bradford 27 5 0
Plastering.—R. H. Theobald, Bradford 38 3 0
Painting.—E. W. Walker, Idle 12 4 0

BRADFORD.—For the erection of a villa residence, Daisy Hill, for Mr. J. Feather. Messrs. Fairbank & Wall, architects, Bank-street, Bradford. Quantities by the architects:—
Masonry.—T. Haigh, Allerton, Bradford £695 0
Joinery.—W. G. Bogg, Manningham, Bradford 325 0
Plumbing.—T. Pratt, Daisy Hill, Bradford 183 0
Plastering.—J. F. Rawnsley, Whetley-lane, Bradford 87 0
Slating.—Hill & Nelson, Edmund-street, Bradford 56 13
Painting.—J. Noble & Son, Allerton, Bradford 20 0
£1,366 13

BRIGHTON.—For the erection of O. P. department at the Sussex County Hospital. Mr. F. T. Cawthorn, architect, 33, New-road, Brighton. Quantities by architect:—

Cook & Sons	£4,703	Barnes	£3,990
Freeman	4,324	Longley & Son	3,989
Parsons & Sons	4,294	Field & Co.	3,960
Griffiths	4,194	Sattin & Evershed	3,957
Lockyer	4,057	Peters & Sons	3,887
Garrett	3,998	Saunders & Sons, Brighton*	3,818

* Accepted.

BRIGHTON.—For the erection of slaughter-house, Hollingdean-yard, for the Town Council. Mr. F. J. C. May, C.E., Town Hall, Brighton:—

R. Cook & Sons	£695	Kemp & Son	£621
Sattin & Evershed	678	J. Longley & Co.	597
P. Peters	625		

BRISTOL.—For additions, &c., to All Saints' Choir School, Clifton, for the Building Committee. Mr. E. Henry Edwards, architect, 4, Unity-street, College Green, Bristol:—

H. T. Margetson	£879	Love & Waite	£767
W. Church	867	Wilkins & Gosling	732
E. Walters	838	W. Smith	700
C. A. Hayes	837	Lovell & Sons	680
Hatherley & Carr	795	[All of Bristol.]	

CARDIFF.—For forming, paving, &c., Cumnock-terrace, and four other streets (two contracts), for the Corporation. Mr. W. Harpur, C.E., Borough Engineer, Town Hall, Cardiff. Quantities by the Borough Engineer:—

	Cumnock-terrace.	Cumnock-place.	Adams-down-place.	Trevethick-street.	Mansfield-street.
Jas. Rich, Cardiff*	£ s. d. 115 7 7	£ s. d. 30 17 9	£ s. d. 98 12 3	£ s. d. 337 10 10	£ s. d. 196 5 9
Ellis & Davies	115 18 2	30 15 8	102 8 6	342 1 2	197 11 0

* Accepted.

CARDIFF.—For the erection of a steam-roller shed, &c., Saltmead-road, for the Corporation. Mr. W. Harpur, C.E., Borough Engineer, Town Hall, Cardiff. Quantities by Borough Engineer:—

J. E. Davies	£1,957 1 7	Robbins	£1,624 18 3
Lewis	1,837 0 0	C. C. Dunn	1,605 11 7
W. T. Morgan	1,730 12 0	Symonds & Co.	1,552 10 1
Marsh & Wride	1,720 10 0	Saltey & Co.	1,538 9 0
Cox & Bardo	1,712 6 0	Rees & Thomas	1,525 0 0
Beer & Sons	1,707 12 0	Jas. Allan	1,524 15 2
Williams & Hoare	1,687 0 0	D. Davies	1,512 0 0
W. Williams	1,639 14 0	Turner & Sons*	1,507 8 3

[All of Cardiff.]
* Accepted.

CHRISTCHURCH.—Accepted for building marine residence at Mudeford, for Mr. H. A. B. Shrubb. Mr. R. S. Balfour, architect, Inverness-terrace, London:—
W. J. Chinchen, Bournemouth £2,000

CLAYTON (Yorks.).—Accepted or the erection of six through houses, Pasture-lane. Messrs. John Drake & Son, architects, Winterbank, Queensbury:—
Masonry.—Proprietor.
Joinery.—Sam. Benn, Queensbury £409
Slating.—James Smithies, Great Horton 94
Plastering.—Thomas Bolton, Great Horton 165
Plumbing.—Benjn. Ingham, Clayton 170
Painting.—L. Sunderland, Great Horton 34

COCKERMOUTH.—For the execution of road-works, Borrowdale, for the Rural District Council. Mr. J. B. Wilson, C.E., Court House-buildings, Cockermouth:—
Borrowdale-road Improvement.
Contract No. 4.

Cowman & Saunders, Keswick	£102 15 4	Fleming & Hughes, Borrowdale*	82 11 6

Contract No. 5.

Cowman & Saunders, Keswick*	70 18 9

Contract No. 6.

Cowman & Saunders, Keswick*	£9 12 6

Contract No. 7.

Fleming & Hughes, Borrowdale	212 16 0	Cowman & Saunders, Keswick*	186 17 6

[Surveyor's estimate, £398.]
* Accepted tenders amount to £408 os. 3d.

DARENTH.—For forming concrete floors, and refitting bath-rooms and lavatories of the infirmary block at the Darenth Imbecile Asylum, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, Architects, 15, Leadenhall-street, E.C.:—

W. Draper	£482 10	M. Johnson & Co., Ltd.	£374 0
J. Fraser & Sons	441 0	McCormick & Sons	367 0
B. Finch & Sons	399 0	Lascelles & Co.	335 0
Thos. Gregory & Co.	395 0	S. W. Gibson, Eynsford, Kent (accepted)	300 0
Stephen Hayworth	379 0		

DOWNHAM MARKET (Norfolk).—For the erection of school buildings, &c., for the Trustees of Mount Tabor Chapel:—

Ellworthy & Son	£430	Collins & Barber, Downham Market (accepted)	£410

GATESHEAD.—Accepted for the execution of paving works, Earl's Drive, &c., for the Corporation. Mr. J. Bower, C.E., Town Hall, Gateshead. Quantities by Surveyor:—
Paving.

J. J. & J. Robson, 95, Osborne-road, Newcastle (1)	£344	2	5
G. E. Simpson, Ellison-terrace, Newcastle (2)	501	2	0
" " " " (3)	158	8	4
" " " " (4)	675	0	0
" " " " (5)	253	5	9
" " " " (6)	81	6	0

Cement.

T. Rule, jun., 2A, Fourth-street, Gateshead (7)	£84	5	9
" " " " (8)	88	15	10
" " " " (9)	25	16	8
" " " " (10)	177	16	1

(1) Earl's Drive, Low Fell. (2) Alexandra-road (Elmgrove-terrace). (3) Lewis-street. (4) Brinkburn-avenue. (5) Bank-street. (6) Bank-street, Kingsboro'-terrace. (7) Earl's Drive, Low Fell. (8) Alexandra-road (Elmgrove-terrace). (9) Lewis-street. (10) Brinkburn-avenue.

GOOLE.—For the erection of hotel, Wetherill-street, for Messrs. Hewitt Bros. Mr. W. B. Andrews, architect, Boothferry-road, Goole:—

L. Davidson	£1,850 0 0	Thompson & Son	£1,627 0 0
H. Waterland	1,828 17 6	Jackson Bros.	1,549 0 0
Marrows	1,669 0 0	T. Burnett, Grimsby*	1,465 0 0
Kelsey	1,651 0 0	J. W. Jackson	1,365 0 0

* Accepted all trades.

GUILDFORD.—For building a pair of semi-detached houses in the Woodbridge-road, for Mr. W. Wells, J.P. Mr. R. Clamp, architect. Quantities supplied:—

Harris & Son	£1,973	J. Sims	£1,905
P. C. May	1,967	Higlett & Hammond	1,859
S. Ellis	1,919	Mitchell Bros., Guildford*	1,858

* Accepted with modifications.

HEVERSHAM.—For the erection of dwelling-house, Leasgill, for Mr. J. German, Junr. Mr. John Banks, architect, Kendal:—
Excavating, Walling, Masonry, &c.

T. Tayler	£334 17 8	R. J. Bell, Arnside*	£266 16 4
Thos. Puckett	288 2 10		

Plastering.

T. Anderson	£38 0 0	R. J. Bell, Arnside*	£34 0 0
R. H. Bellington	36 0 0	J. Steel & Co.	31 10 0

Joiners and Carpenters' Work.

Paul Burrur	£180 0 0	T. Crossfield, Arnside†	£124 0 0
D. Willary	149 4 0	H. M. Jennings	122 10 6
J. Sisson	139 0 0	A. Nelson	122 10 0
R. Tisson	133 13 0	Hy. Collett	118 10 0

Plumbing, Painting, and Glazing.

Ralph Thompson	£86 14 9	R. H. Billington	£56 0 0
Wm. Parsons	65 11 6		

* Accepted.
† Accepted, but included some additional work.

HINCKLEY (Leicester).—For making pathways, &c. (Contract No. 3), for the Urban District Council. Mr. W. T. Howse, Surveyor, Hinckley:—

A. Jewell	£575 10 0	J. Holden, Hinckley*	£463 5 0
T. Daniels	552 7 0	J. Mason	458 5 8
J. Holmes	498 5 1		

* Accepted.

HORSELL (Surrey).—For building a residence at Kettlewell, Horsell Moor, for Mr. Claude Marzetti. Mr. Robert Clamp, architect, Woking. Quantities by Mr. H. Webster, Woking:—

Lowe	£2,655	Watson	£2,488
May	2,586	J. Sims	2,475
Norris & Son	2,574	Harris & Son, Woking*	2,400
Higlett & Hammond	2,569		

* Accepted.

LEEDS.—Accepted for the erection of residence, Roundhay, for Mr. Allison. Mr. W. C. Hall, architect, Prudential Buildings, Park Row, Leeds. Quantities by the architect:—

Bricklaying and Masonry.—Thompson & Sons	£300	0	0
Carpentry and Joinery.—Blakeley & Thackeray	145	12	0
Plumbing.—Wesley Briggs	50	9	4
Slating.—J. Season	37	6	9
Painting.—W. Taylor	14	10	0
Plastering.—R. Branton	38	4	5
	£316	2	6

[All of Leeds.]

LONDON.—For repairs and alterations to house, North Brixton, for Mr. James Howell, Moor Park:—
John U. Davis £443 16 6
[No competition.]

LEEDS.—Accepted for the erection of a detached residence, Lidgett Park, Gledhow, for Mr. H. Horsman. Mr. W. Carby Hall, architect, Prudential Buildings, Leeds. Quantities by the architect:—

Bricklaying.—Thompson & Son £264 0 0
Joinery.—T. Benton 198 10 0
Plumbing.—Wesley Briggs 50 0 0
Painting.—Flesher & Robinson 11 13 3
Slating.—T. E. Heavysides 33 10 0
Plastering.—W. J. Haddock 47 10 0

£695 3 3

[All of Leeds.]

LEICESTER.—For the formation of a new street between Mill-lane and Jarrow-street, for the Trustees of Trinity Hospital. Messrs. R. J. & J. Goodacre, surveyors, 5, Friar-lane, Leicester:—

Stimpson & Roilston	£1,530	Loch	£1,507
Philbrick	1,520	J. Hutchinson & Son*	1,500

[All of Leicester.]
* Accepted.

LLANGYNLLO (Wales).—For the erection of a tower and porch at the parish church, for the Building Committee. Mr. F. R. Kempson, architect, 138, Widemarsh-street, Hereford. Quantities by the architect:—

Colleris & Godfrey	£830 0 0	R. Morgan	£685 4 3
W. P. Lewis & Co.	787 0 0	T. Bowen	625 10 0
H. Smith	787 0 0	John Price, Builth*	633 0 0

* Accepted.

LONDON.—For decoration and sanitary improvements at 44, St. John's Wood Park, N.W.:—

Styles & Son	£308	Melbourne	£254
Manktelow	290		

LONDON.—For the erection of fire-escape, staircase and bridge, at the Chelsea Infirmary, for the Guardians of St. Luke, Chelsea. Messrs. Lansdell & Harrison, architects, 12, Compton-terrace, Highbury, N.:—

H. Wall & Co.	£652	Simplex Stoker Co.	£536
St. Pancras Iron Co.	614	Cadogan Iron Works	492
Wm. Norton	576	Moorwood & Sons, Sheffield*	475
May Bros	560		

* Accepted.

LONDON.—Accepted for the extension of the Hammersmith and West Kensington Synagogue, Brook Green, W. Mr. Delissa Joseph, architect, 17 and 18, Basinghall-street, E.C.:—
Chamberlen Bros. £2,158

LONDON.—For warehouse and shop on the site of Nos. 102 and 103, Minories, E.C., for Messrs. F. Wiggins & Sons. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C.:—

G. E. Todd	£4,692	I. Greenwood	£3,987
J. Grover & Sons	4,520	McCormick & Sons	3 937
T. E. Mitchell	4,507	E. Lawrance & Sons, Wharf-road, City-road*	3,780
W. Johnson & Co., Ltd.	4,441		
Thos. Gregory & Co.	4,395		

* Accepted.

LONDON.—For alterations and additions to house and stables, No. 13, Gloucester-square, W. Messrs. Mullett, Booker, & Co., surveyors. No quantities:—

Graham & Banks	£1,644 0	Godfrey Giles & Co.	£1,315 10
Herbert Hanks	1,414 10	J. Kinninmont & Sons*	1,194 0

* Accepted.

LONDON.—For internal and external decorations and repairs to nine houses and shops in Kentish Town-road, N.W. Mr. C. R. B. Pead, architect and surveyor, 13, Bartlett's-buildings, Holborn.

Knight	£600	J. Hebblethwaite, Vauxhall Bridge-road*	£485
King	500		

* Accepted.

LONDON.—For providing and fixing two glazed partitions in the boys' and girls' departments of the William-street School, Hammersmith-road, and for other work, for the School Board for London. Mr. T. J. Bailey, Architect:—

J. Garrett & Son	£290	W. Hammond	£258 0
J. Christie	287 5	F. T. Chinchen, Kensal Green*	255 0
G. H. Sealy	285 0		

* Recommended for acceptance by the Works Committee.

LONDON.—For erecting a combined cookery and laundry centre in connexion with the Haseltine-road School, Lower Sydenham, and for other work, for the School Board for London. Mr. T. J. Bailey, Architect:—

W. Downs	£1,899 0	Jas. Smith & Sons	£1,609 0
E. Proctor	1,762 6	E. Triggs	1,598 0
Garrett & Son	1,727 0	J. & C. Bowyer	1,593 0
W. King & Son	1,709 0	W. Akers & Co., South Norwood*	1,525 0
J. Otway	1,691 0	Mid-Kent Building and Contracting Works, Ld.	1,510 0
F. G. Minter	1,675 0		
A. Black & Son	1,663 0		

* Recommended for acceptance by the Works Committee.

LOWESTOFT.—For erecting the College, Gordon-road, Lowestoft. Mr. George Baines, architect, 4, Great Winchester-street, London, and Lowestoft:—

William Knight	£1,450 0	G. E. Hawes	£1,370 0
Gill	1,450 0	John Welham*	£1,241 12
Allerton & Earl	1,400 0	" and £60 added	1,300 0
John Ashby	1,395 0	G. E. Hawes†	1,295 0

* Withdrawn.
† Accepted, with Robert T. Peck, for plumbing, gasfitting, glazing, and painting.

MAIDENHEAD.—For the erection of a bungalow, for Miss Morrison. Messrs. Homer & Kidler, architects, 35, Bucklersbury, E.C.:—

Cooper & Co.	£957	Silver & Son	£924
Edwards	949	Irwin	866

MELBOURNE, near Derby.—Accepted, subject to modifications, for the erection of school-buildings, &c., Dent's Close, for the School Board. Mr. Henry Beck, architect, 32, High-street, Burton-on-Trent:—

Bricklaying, Masonry, Tiling, &c., Work.
W. Barton £3,992 17 6
Carpentry and Joinery Work.
J. Bullock £1,519 0 0
Plumbing, Glazing, and Painting.
M. Jeynes £666 10 0

£6,178 7 6

[All of Melbourne.]

NELSON (Lancs.).—Accepted for the execution of street paving works, Kiln-street and others, for the Corporation. Mr. B. Ball, Borough Surveyor, Town Hall, Nelson:—
Chew £2,499 12 10

OLDBURY (Worcestershire).—For the execution of sewerage works, for the Urban District Council. Mr. T. H. Shipton, Surveyor, Public Buildings, Oldbury:—

H. Weldon	£7,343 18 5	John Dallow	£5,550 0 0
Crwys & Hobrough	6,943 13 3	Geo. Trentham	5,382 0 0
Currall & Lewis	6,511 9 11	Jacob Biggs	5,210 0 0
John Mackay	6,464 12 4	Herbert Holloway, Wolverhampton*	4,990 0 0
Jones & Fitzmaurice	6,085 0 0		
Geo. Bell	6,073 0 0		

* Accepted.

OXFORD.—Accepted for the erection of porter's lodge, and additions to hospital, &c., Cold Arbour, for the Corporation. Mr. W. H. Castle, Surveyor, Grove-place, Oxford:—
John Wooldridge, Oxford £688 14

SCARBOROUGH.—Accepted for the erection of a residence, Cloughton, for Mr. H. Barran. Mr. W. Carby Hall, architect, Prudential Buildings, Park Row, Leeds. Quantities by the architect:—

Masonry, Joinery, and Plastering.—Thomas Petch, Scarborough £867 9 0
Plumbing—J. Lindley, Leeds 103 0 0
Painting—Grisdale, Leeds 23 10 0
Tiling.—Pickles Bros., Leeds 76 13 0

£1,070 2 0

SOUTHPORT.—For the third portion of extensions to "Belle Vue," Southport, for Sir George A. Pilkington. Mr. C. Sydney Ingham, architect. Quantities by the architect:—

Wishart & Irving	£1,334 0 0	Fairbridge & Hatch	£1,305 0 0
John Fenton	1,330 0 0	Duxfield Bros.*	1,289 11 11
Wm. H. Foster	1,320 0 0		

* Accepted.
[All of Southport.]

SOUTHPORT.—For the electric lighting and fittings, "Belle Vue," Southport, for Sir George A. Pilkington. Mr. C. Sydney Ingham, architect. Specification by the architect:—

George Hill & Co.	£345 3 0	Verity & Co.	£293 6 0
Liverpool Electric Supply Co.	340 0 0	Albert Maund, Southport*	283 0 0
Manchester Edison-Swan Co.	304 11 6		

* Accepted.

STAFFORD.—For the construction of sewage outfall works, &c., for the Corporation. Mr. W. Blackshaw, Borough Engineer, Borough Hall, Stafford:—

E. Tempest, Stafford	£1,201 11 11	Sewage reception tank.
J. Biggs, Birmingham	2,145 0 0	Precipitation tanks.
" " "	1,288 0 0	Pumping main.

TOTTENHAM.—For temporary isolation block at the North Eastern Fever Hospital, St. Ann's-road, Tottenham, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, Architects, 15, Leadenhall-street, E.C.:—

C. E. Todd	£874	C. Miskin	£583
McCormick & Sons	640	W Shurmur, Upper Clapton, E.*	549
Leslie & Co., Ltd.	628		
W. Johnson & Co., Ltd.	598		

* Accepted.

TUNBRIDGE WELLS.—Accepted for Calverley Hill drainage and sanitary work. Mr. Parnacott, surveyor, 93, York-road, Westminster Bridge-road:—
Geo. Mansfield & Son £300

WALMER (Kent).—For new aisle and vestry at St. Saviour's Church. Mr. Thomas Dinwiddy, architect:—

G. H. Denne	£935	J. J. Wise (accepted)	£639
W. J. Adcock	915		

WATFORD.—For erecting new ale stores, Watford:—

G. Grimwood & Sons	£1,390 0 0	G. & J. Waterman	£1,089 0 0
W. B. Neal	1,381 0 0	Geo. Wiggs	1,085 0 0
I. W. Lovatt	1,348 0 0	W. Judge	1,065 16 2
J. Chessum & Sons	1,279 0 0	C. Eames	1,060 0 0
S Grist	1,198 0 0	W. Pavey	1,054 8 0
T. Turner	1,190 0 0	F. Dupont	1,036 0 0
H. Wall & Co.	1,175 0 0	J. Wulmott & Sons, Hitchin*	993 0 0
C. Miskin	1,133 0 0		
C. W. D. Reed	1,125 0 0		

* Accepted.

WEST HAM.—For the execution of street works, Aldworth-road &c., for the Town Council. Mr. Lewis Angell, Borough Engineer Town Hall, Stratford, E.:—

	Group I.	Group II.
Corporation Works Department	£4,042 13 9	£2,647 9 3
W. Farrar	4,037 18 3	2,561 3 6
A. & H. Rutty	3,688 0 9	2,486 14 0
J. Jackson	3,600 0 0	2,407 0 0
W. Griffiths	3,559 1 0	2,198 14 10
G. Wilson	3,526 9 7	2,248 19 11
T. Adams	3,428 2 10	2,164 1 9
Gibb & Co., Ilford (accepted)	2,795 2 0	1,864 4 1

WINDERMERE.—For the erection of stables, &c., for Dr. Mason. Mr. Robt. Walker, architect, Windermere:—

Masonry.—Atkinson Bros., Windermere
Joinery.—Latham & Dobson, Windermere
Plastering, Cementing, Tiling, &c.—E. J. Keighley, Windermere
Plumbing, Glazing, and Painting.—J. A. Pattinson, Windermere
} £840

WOKING.—For the erection of school buildings, Westfield, for the School Board. Messrs. Welman & Street, architects, Church-street, Godalming:—

A. Lawson	£1,578	McWilliam & Son	£1,294
Harris & Son	1,462	J. Whitburn	1,275
W. Greenfield	1,370	Ingram & Son	1,245
Hughes	1,336	J. Martin, Addlestone*	1,166
Peters	1,297		

* Accepted, subject to approval of the Education Department.

WOKING.—For building two cottages for Mr. Wm. Russell. Mr. R. Clamp, architect, Woking. Quantities supplied:—

J. E. Downes	£750	T. B. Engal	£635
J. Whitburn	700	T. Millard	633
Harris & Son	697	J. Sims, Basingstoke*	629
Hull & Son	669		

* Accepted.

TO CORRESPONDENTS.

F. C. H. (amount should have been stated)—J. & S.—W. J. H. (below our limit).

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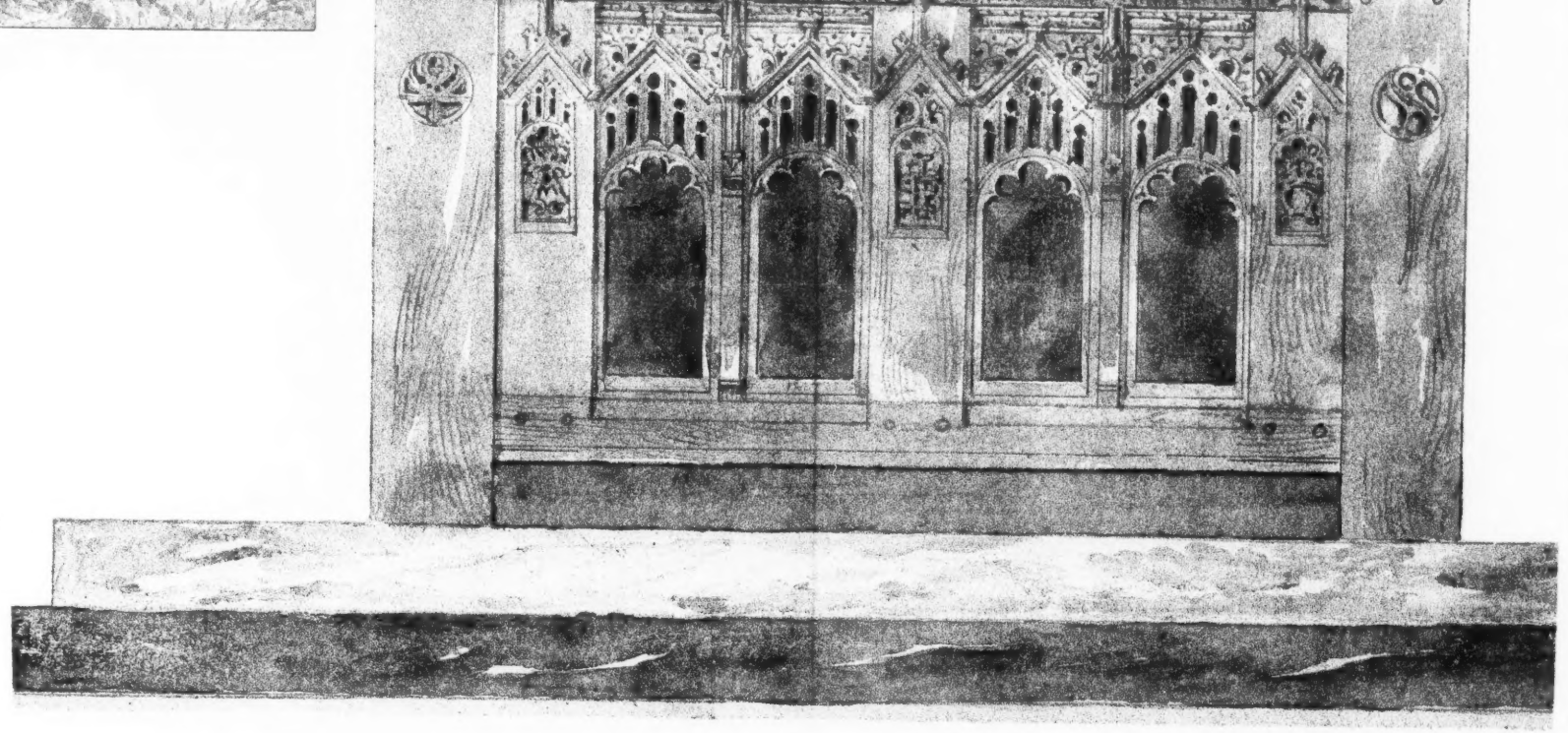
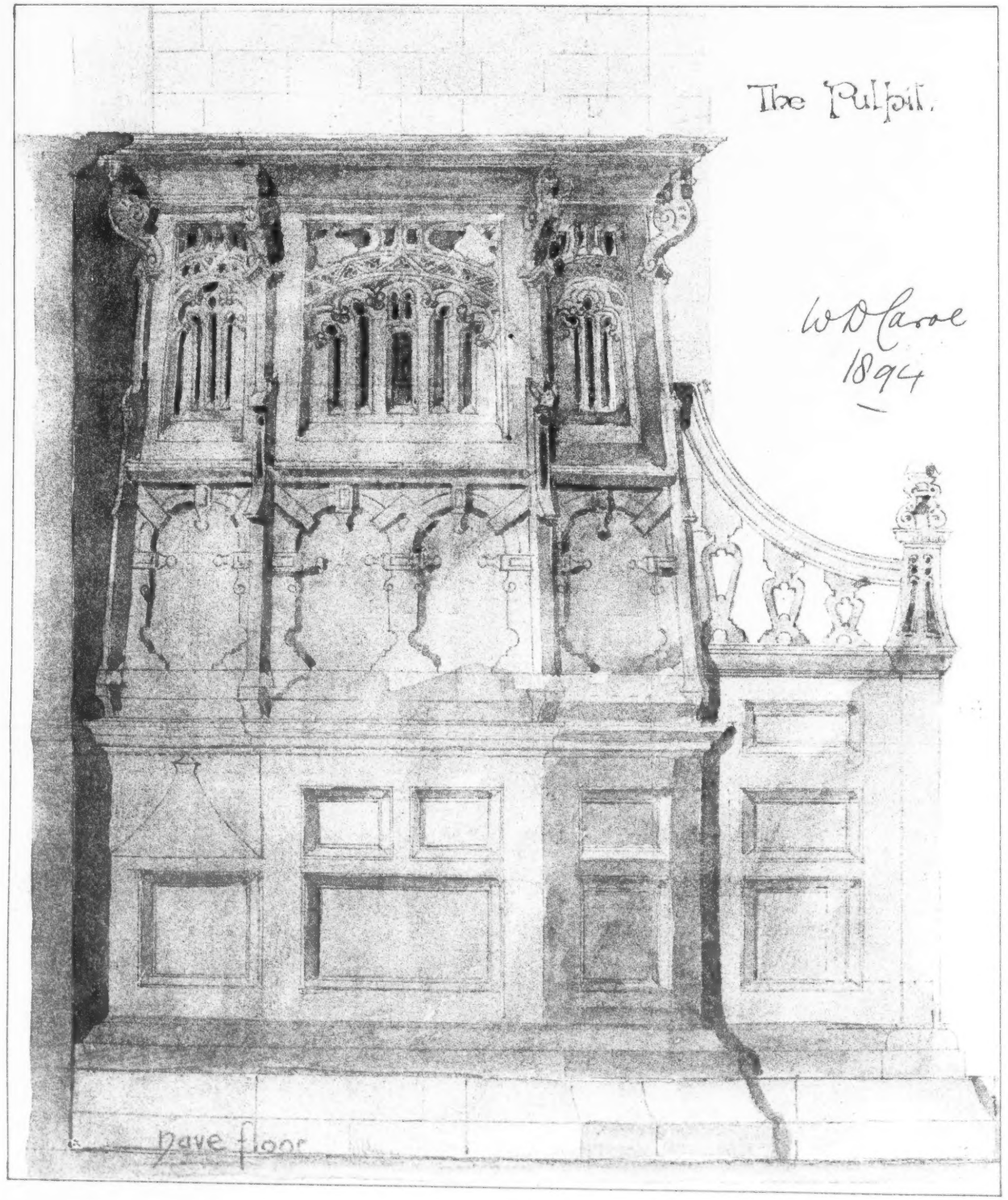
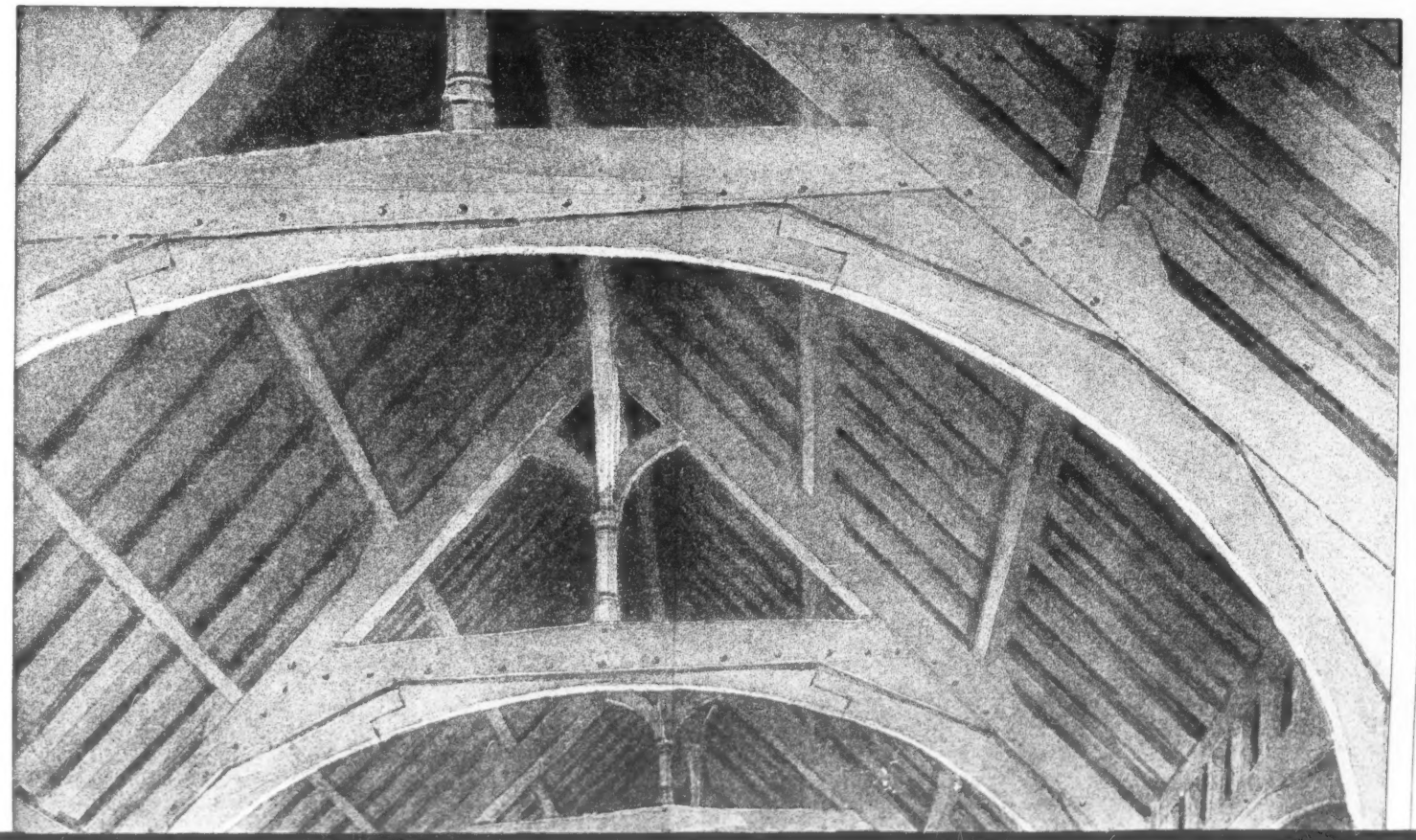
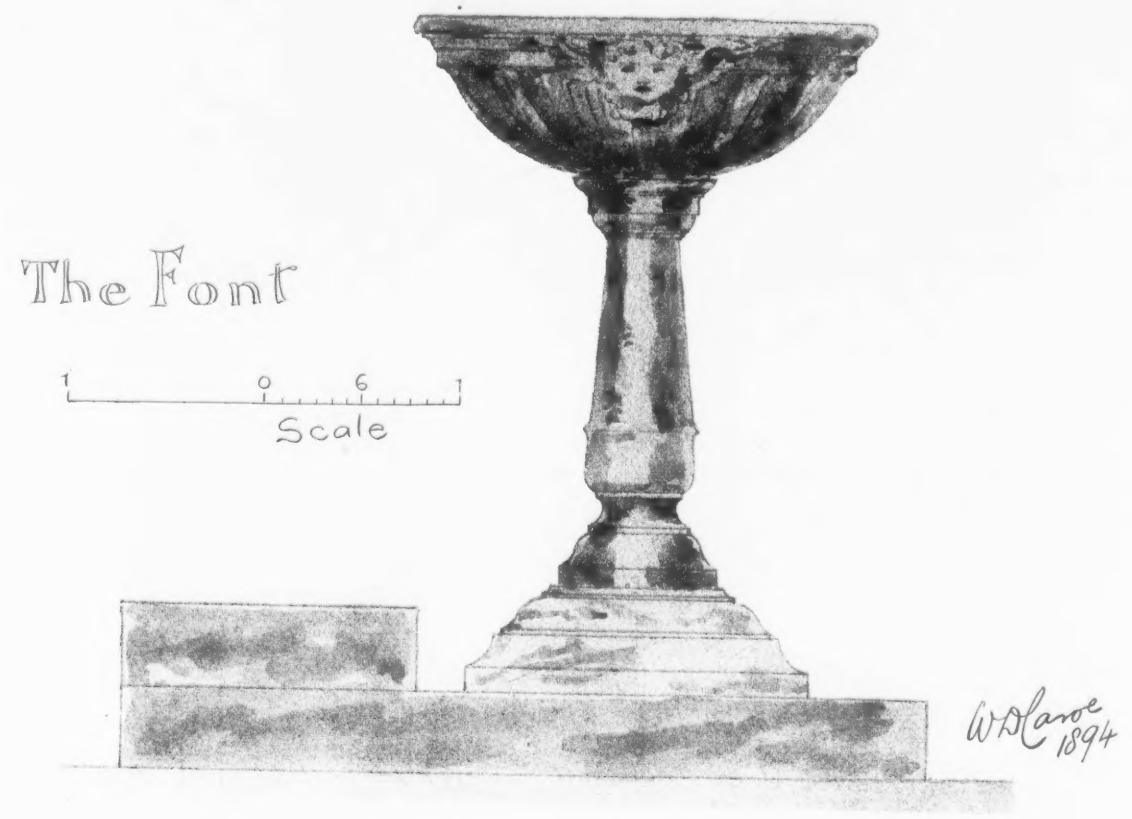


The Altar

W D Lavoe
1894






The Font
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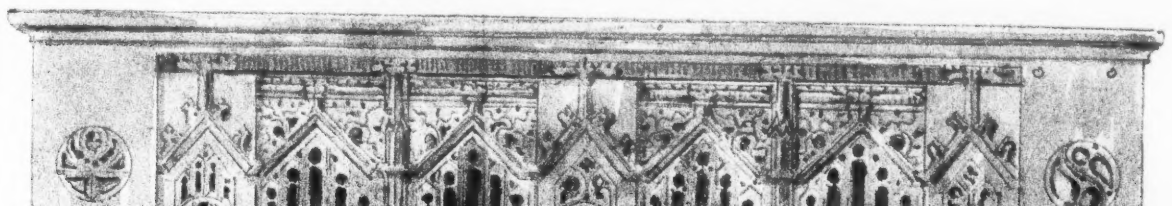
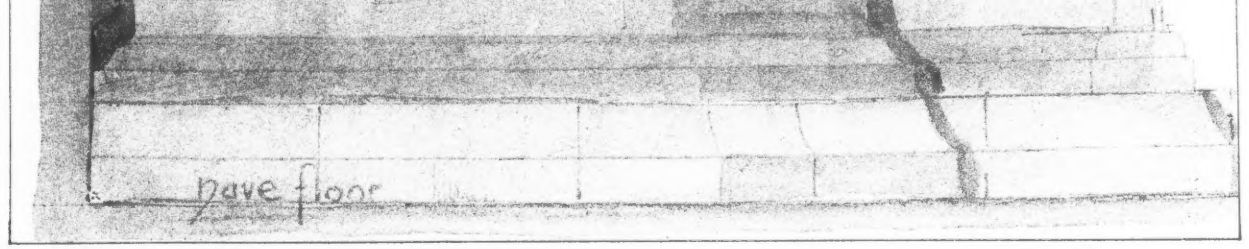
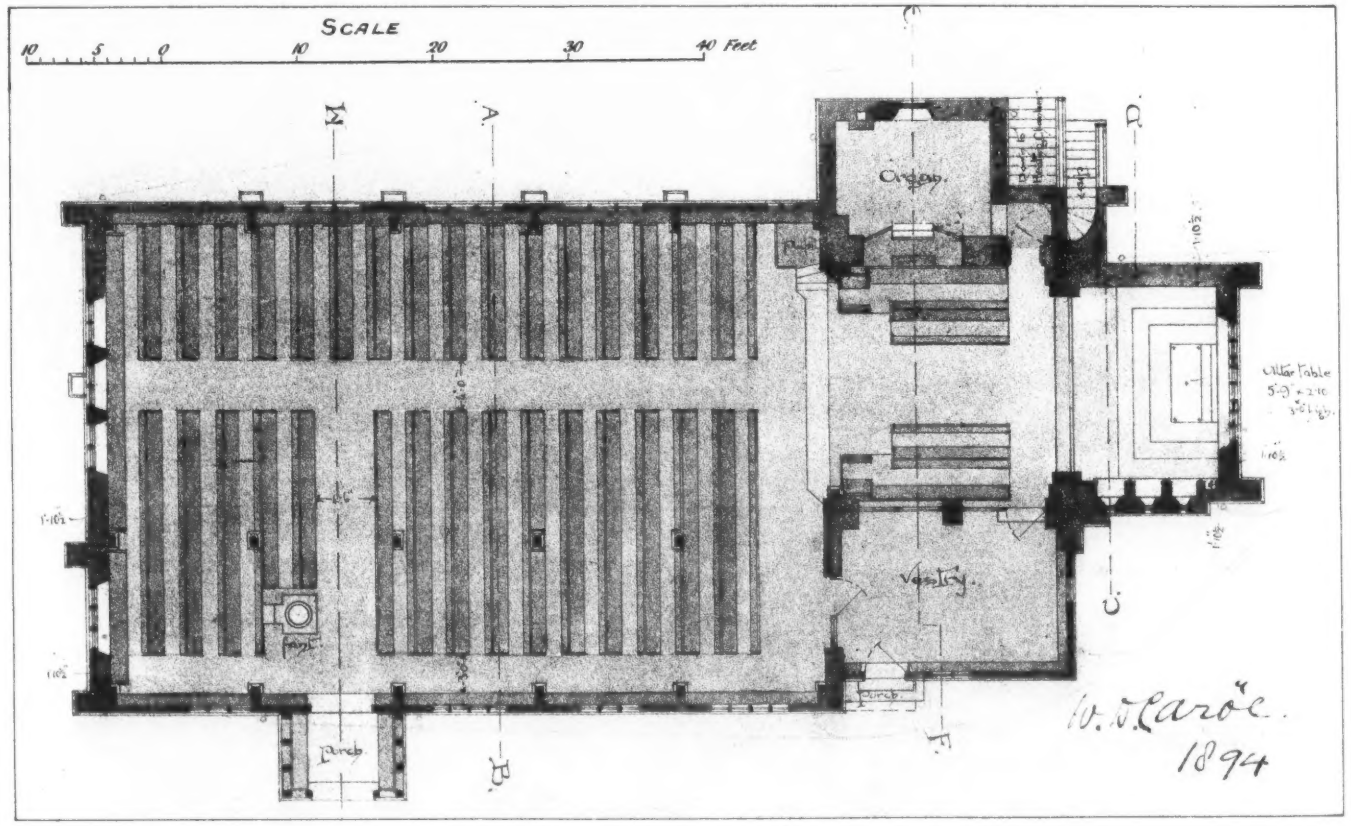
W.H. Lane 1894







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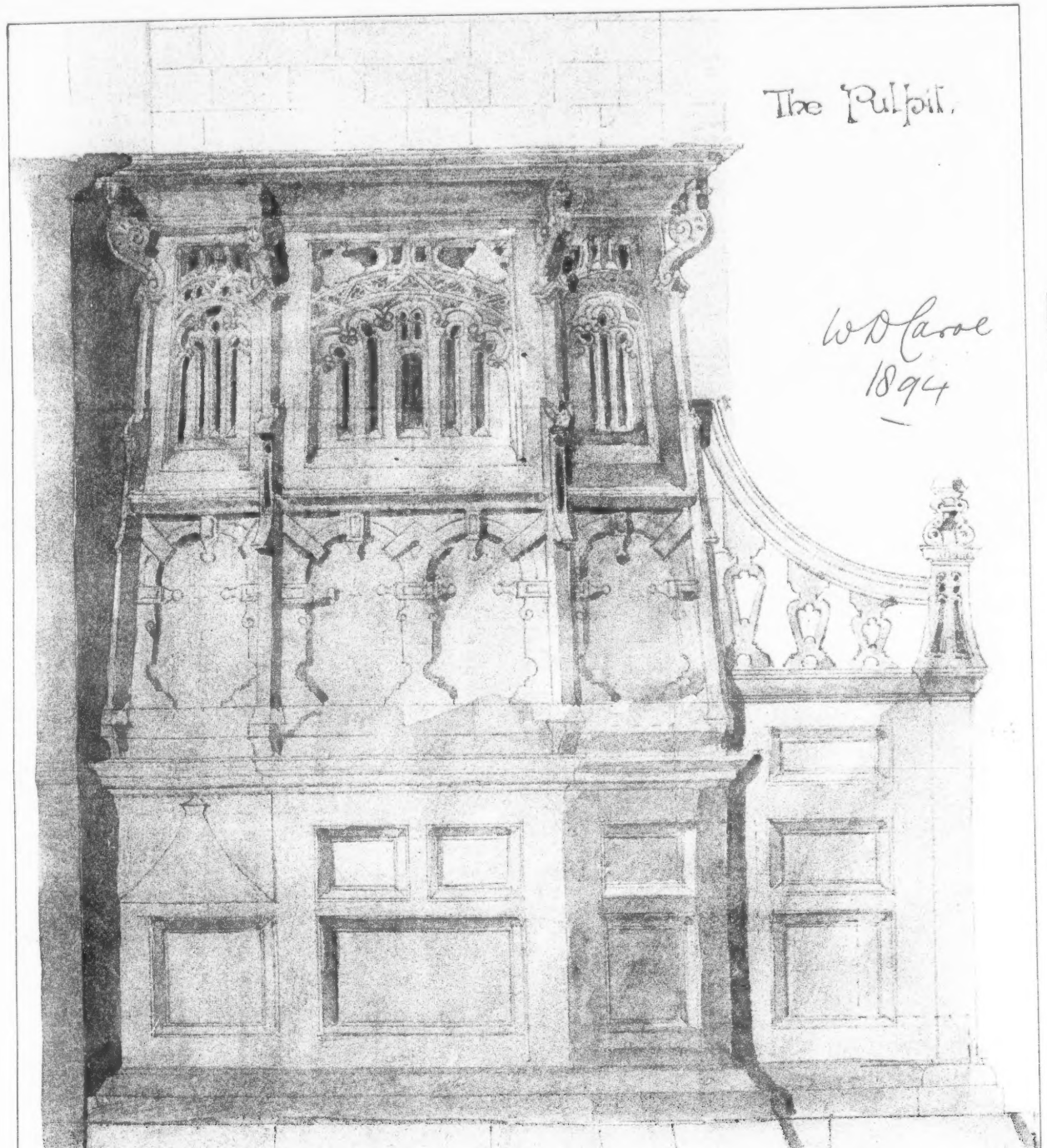

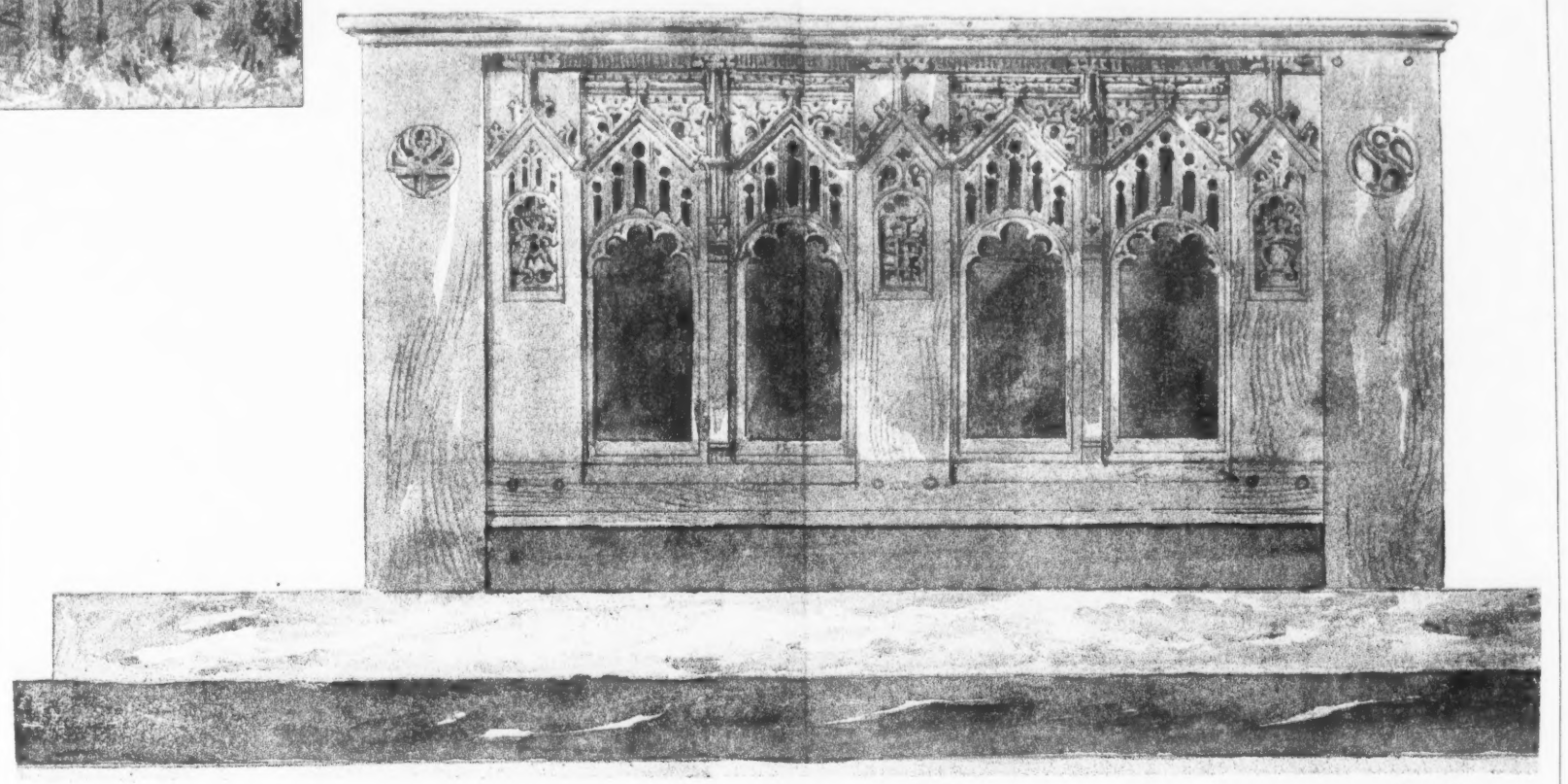

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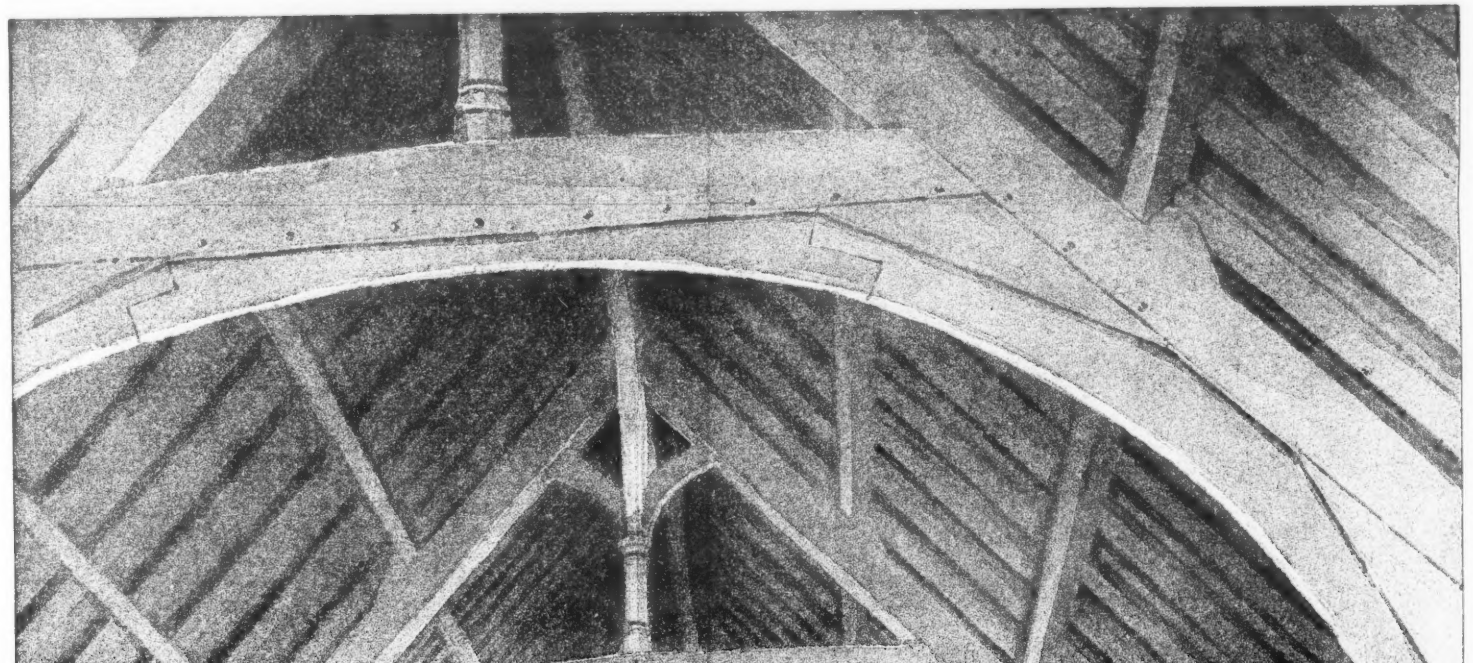

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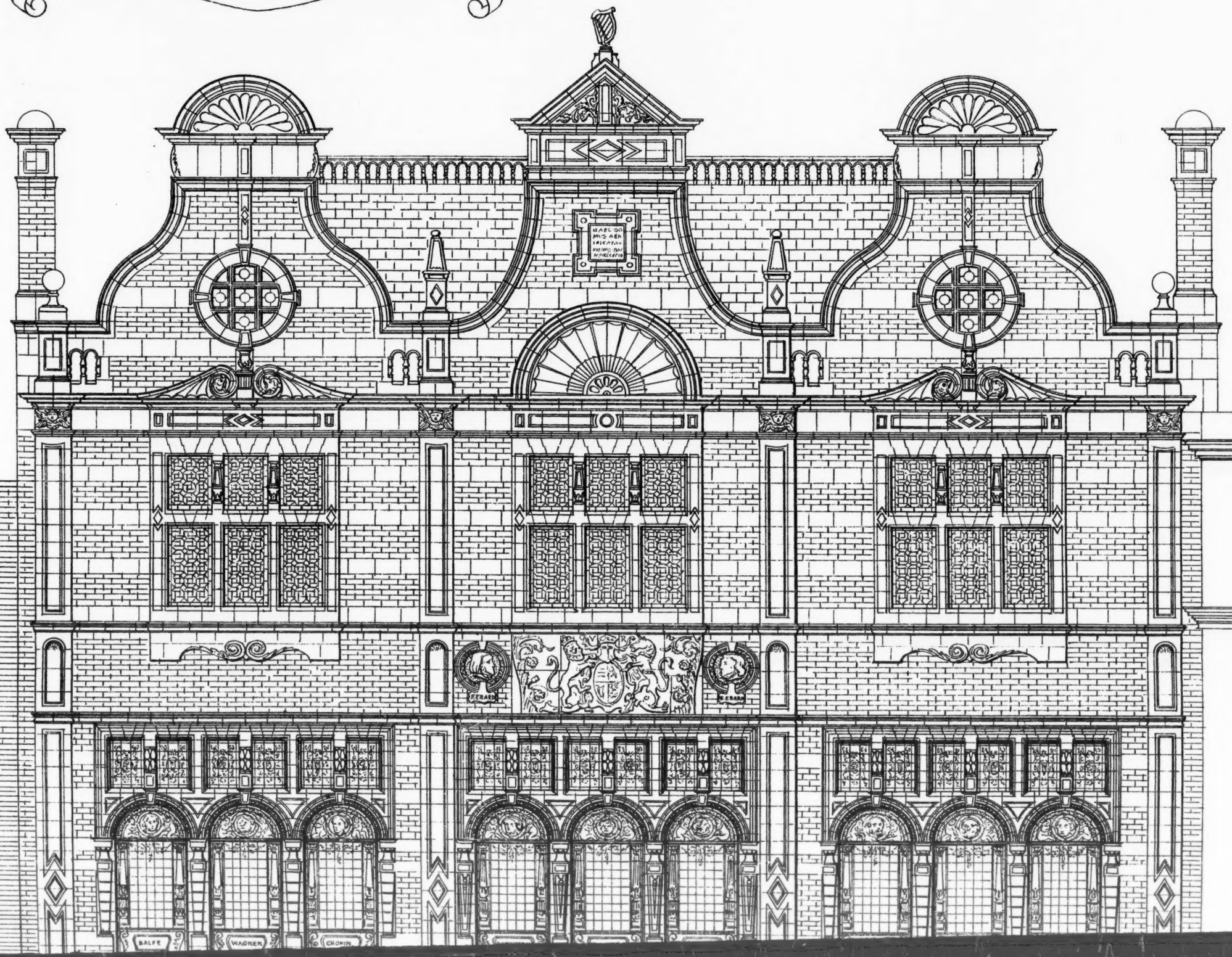

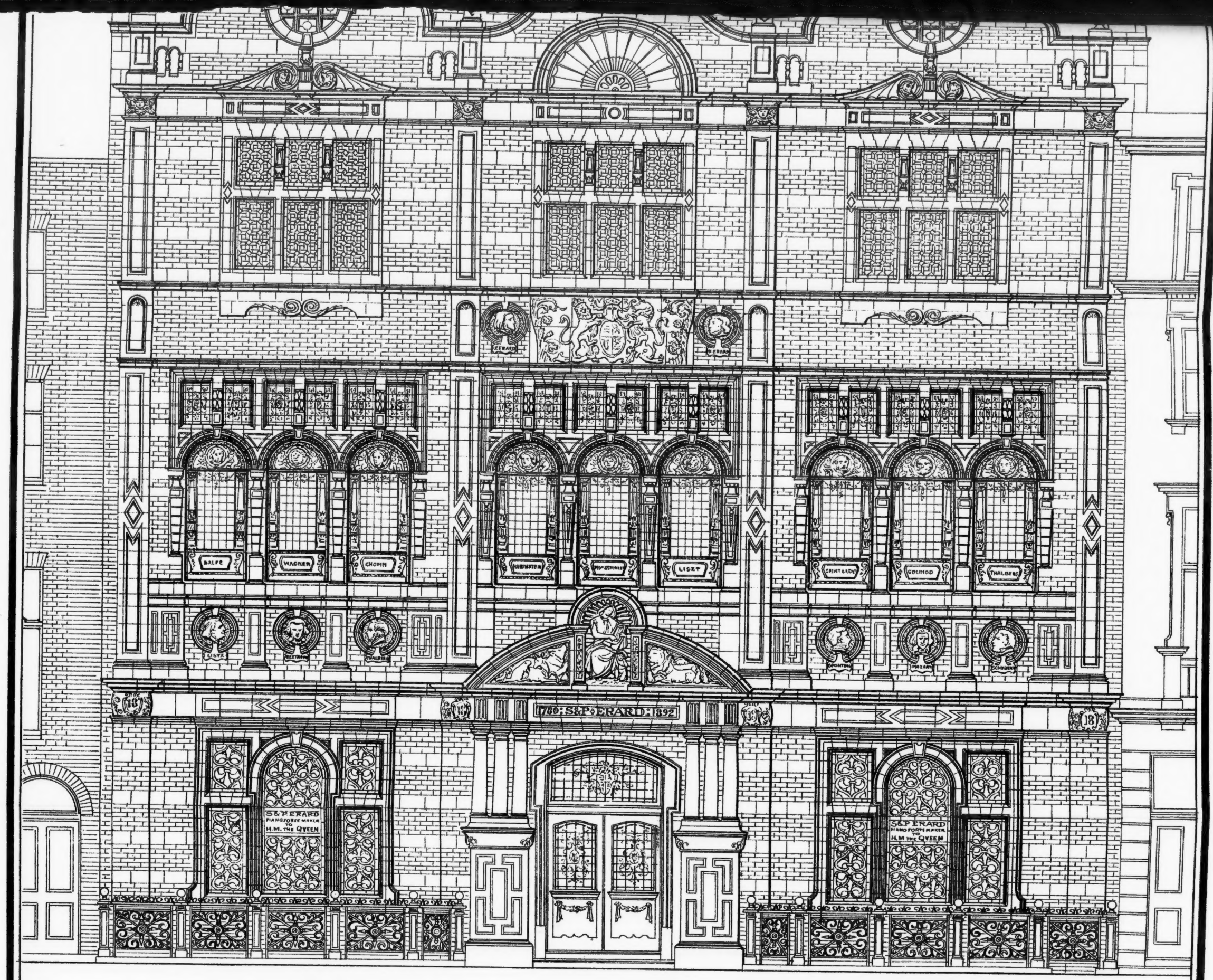

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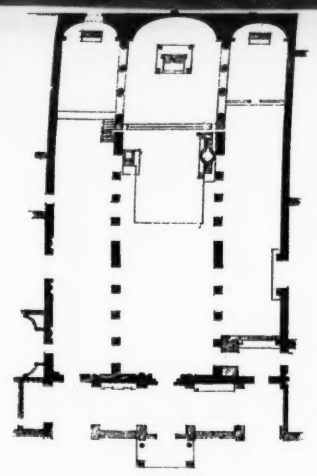

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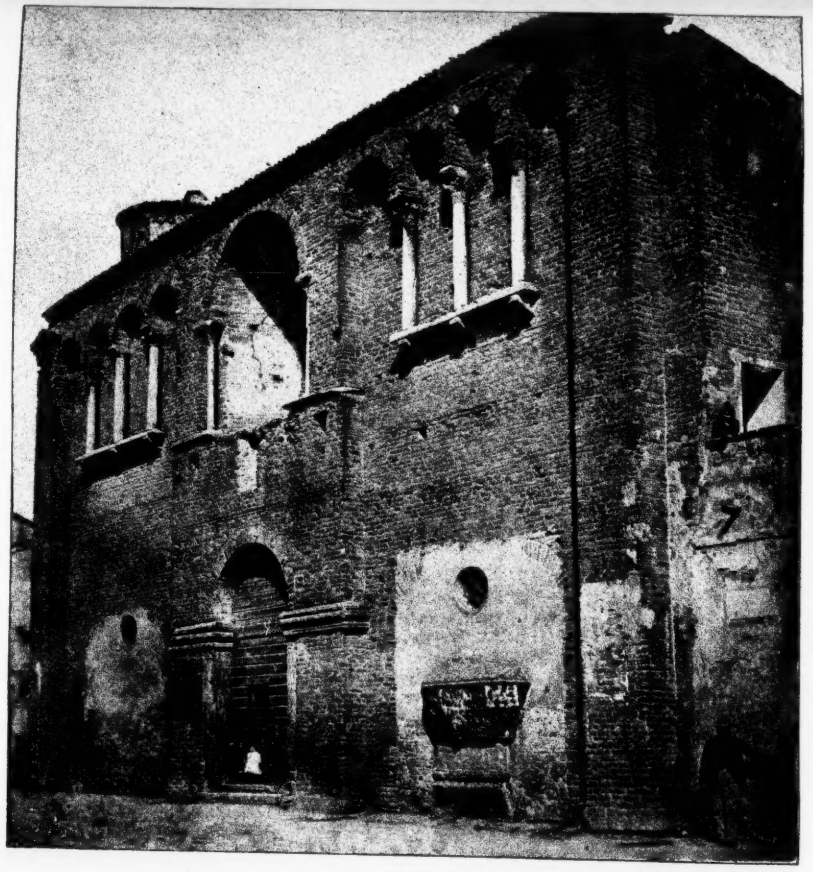
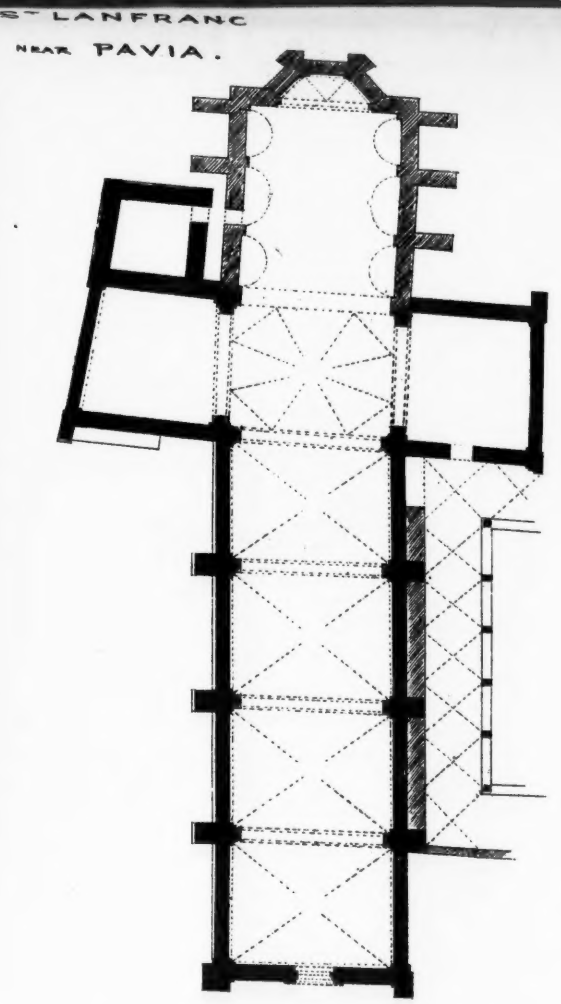
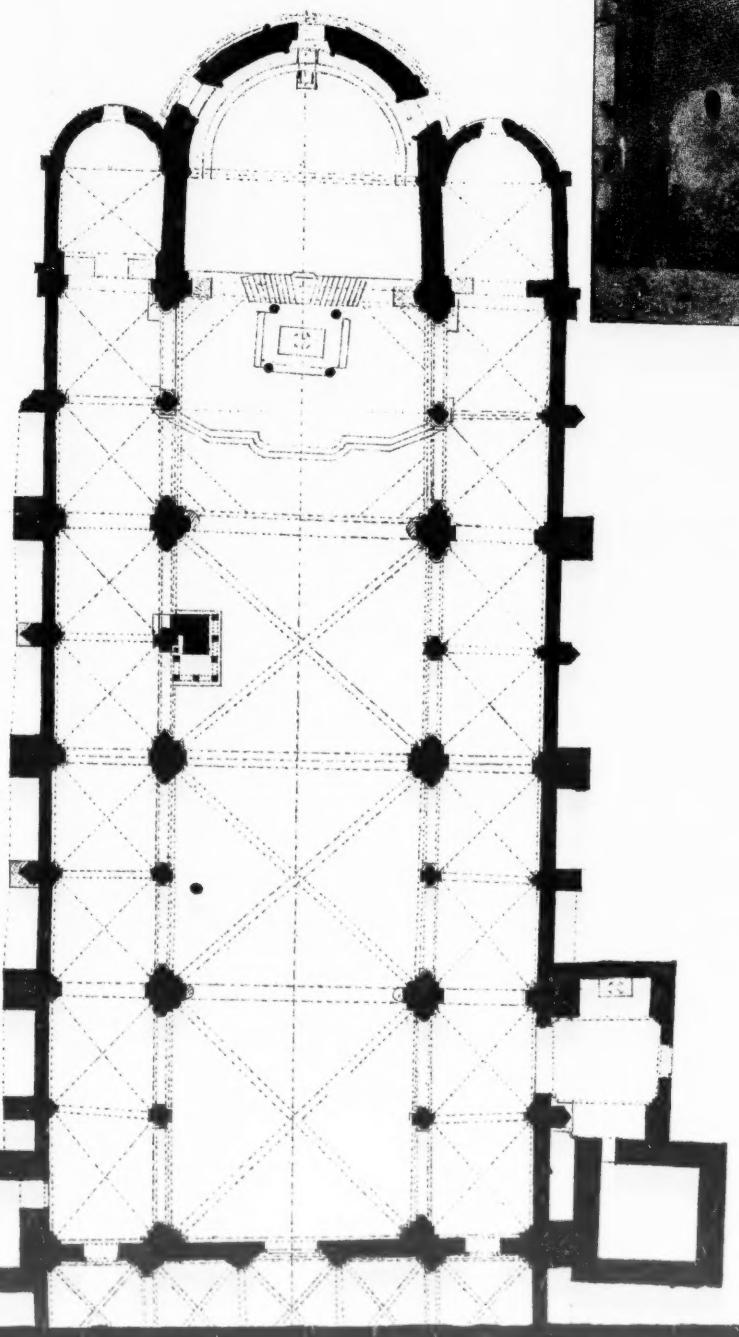
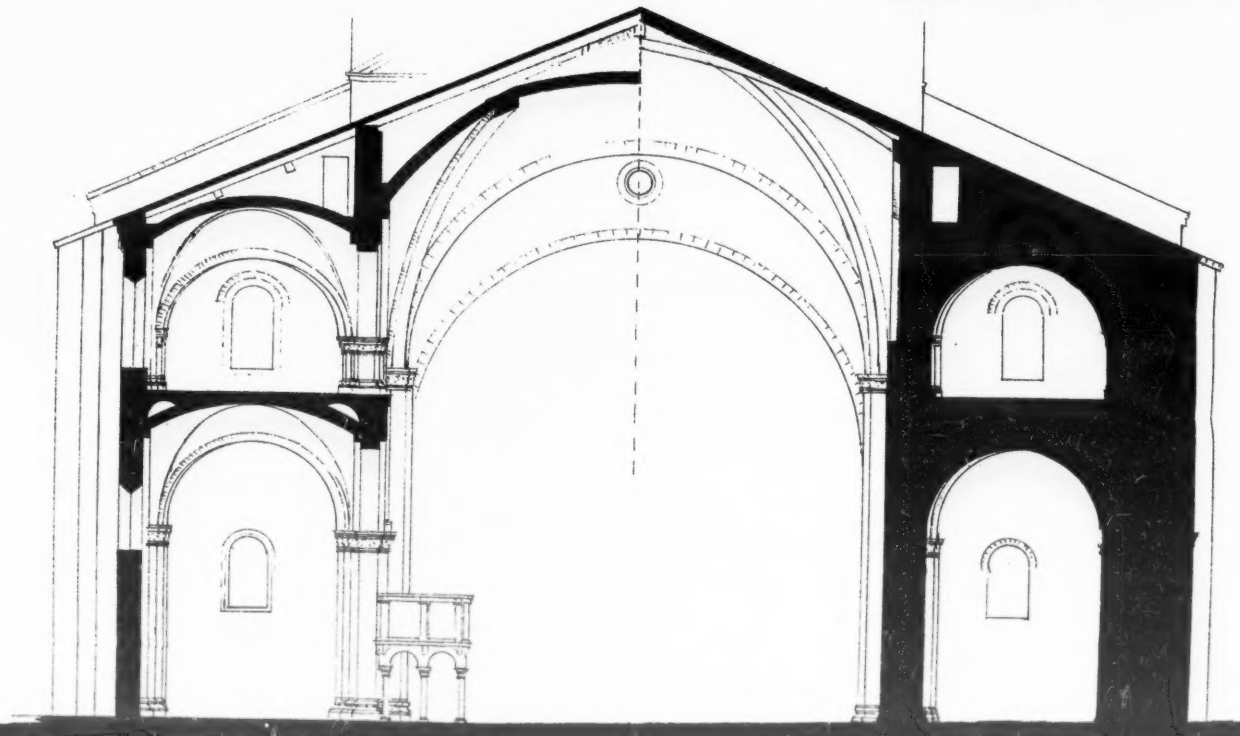


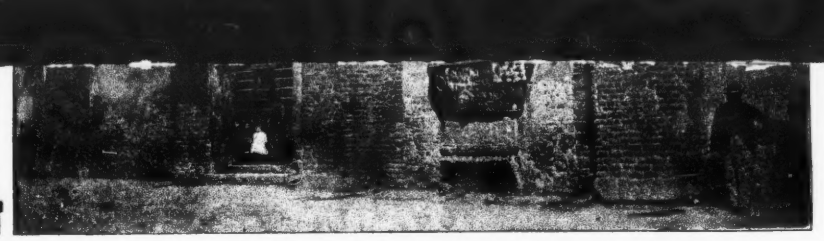
PALACE OF THEODORIC, RAVENNA.

(Circa 500 A.D.)









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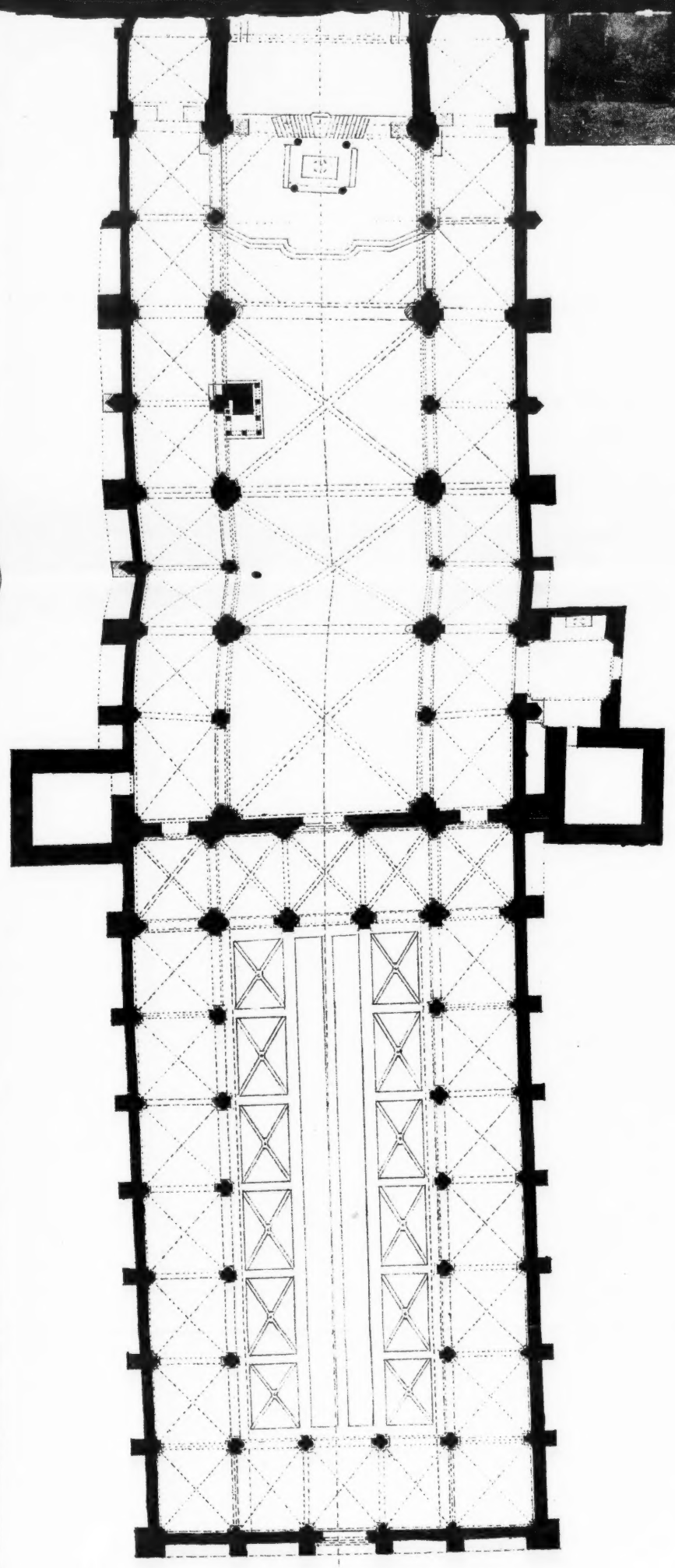

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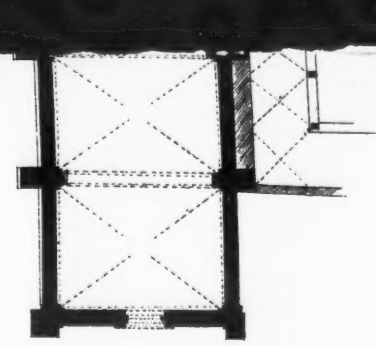
10 5 0 20 30 Metres

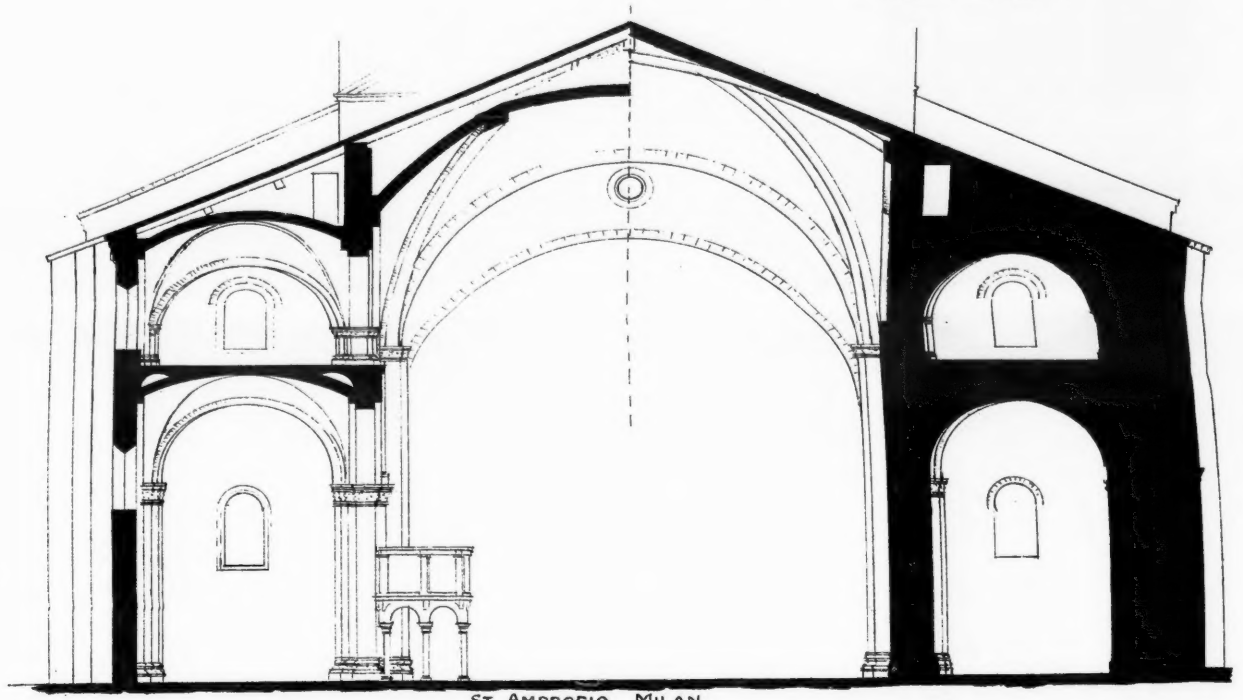


10 5 0 10 metres

SCALE OF METRES

10 5 0 10 20 30 40 50 150 feet

- SCALE OF FEET -



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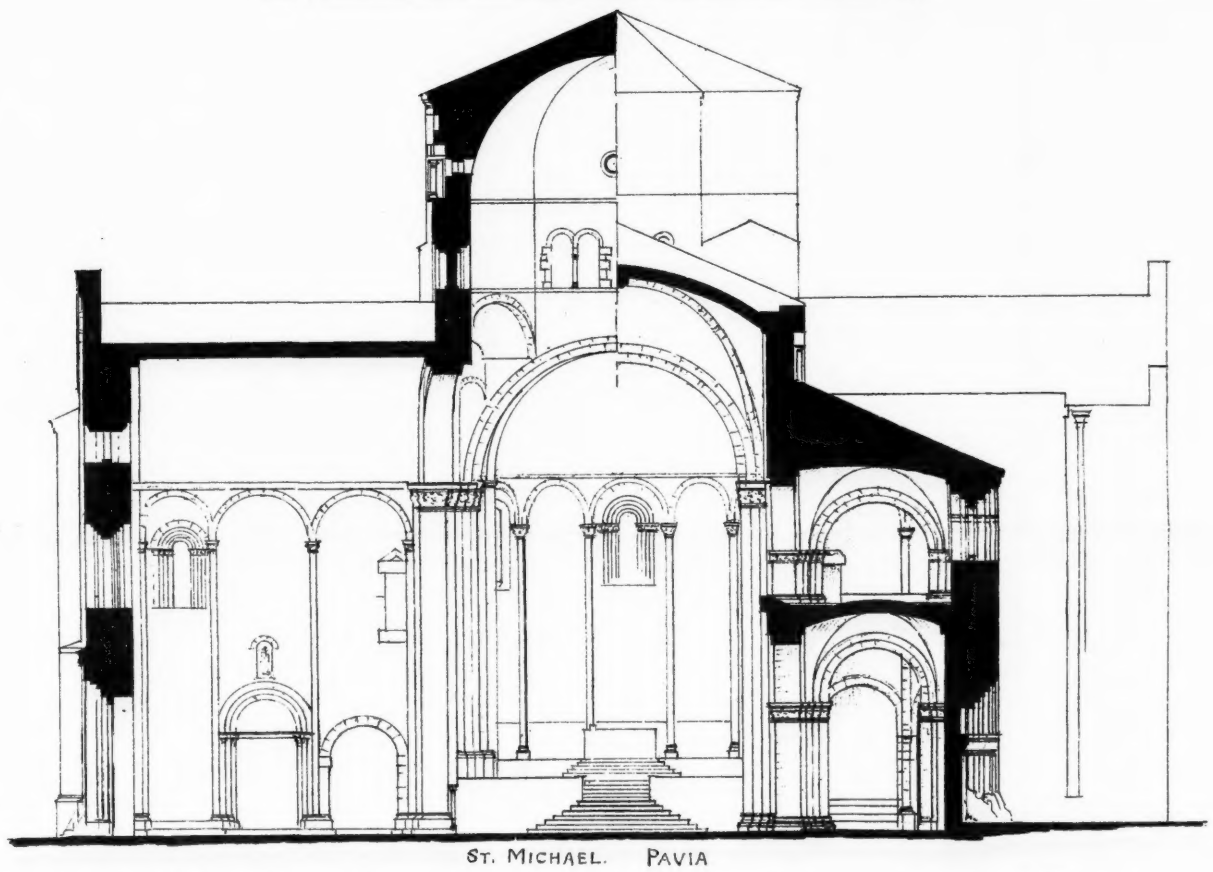
Scale of Feet 5 0 10 20 30 40



ST. MICHAEL. PAVIA

10 5 0 10 20 30 40 50 100 feet

- SCALE OF FEET -

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